

Where now for UK industrial policy?

Policy Exchange 

Lessons from the past, and from other countries

Geoffrey Owen



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About the Author

Since joining the Financial Times in 1958, the author has been a close observer of industrial policy. He worked as the FT's industrial correspondent and industrial editor, and as US correspondent in New York. He left the FT between 1969 and 1972 to work for the Industrial Reorganisation Corporation and then for British Leyland. After returning to the FT he served as deputy editor (1973- 1980) and editor (1980-1990). After retiring from the FT he worked as a lecturer at the London School of Economics. In 2019 he was appointed head of industrial policy at Policy Exchange.

Endorsements

“Sir Geoffrey’s thoughtful history of modern Industrial Strategy illuminates how our governments have attempted, with greater or lesser degrees of success, to drive growth. Policy Exchange’s report rightly emphasises the importance of a consistent and predictable policy environment for securing business investment, and that horizontal measures, in particular support for research and innovation, are vital if we are to compete in the modern world. In the face of increasing protectionism, it is vital that the UK avoids being drawn into a costly subsidy race – and whilst it is important to support enabling technologies, such as batteries, this should be done in a way that supports competition and the entry of innovative new companies to the market.”

Lord Clement-Jones, Liberal Democrat Lords Spokesperson for Science, Innovation and Technology and member of the Industry and Regulators Committee

“As a member of the Business and Trade Select Committee, and as Chair of the APPG for Manufacturing, I welcome Policy Exchange’s rigorous history of British Industrial Strategy. Sir Geoffrey’s paper rightly identifies that a coherent approach, with certainty for industry, is a key ingredient for success and I will do all that I can to ensure that our brilliant UK manufacturers and businesses are allowed to grow and thrive in the UK .”

Mark Pawsey MP, Member of the Business and Trade Select Committee and Chair of the APPG for Manufacturing

“Policy Exchange’s comprehensive history of British Industrial Strategy gives the Government plenty of food for thought. I am incredibly proud of our industrial heritage, not least the ceramics industry and its continued place at the heart of the Potteries’ economy in my Stoke-on-Trent Central constituency. The report rightly asserts that as far as possible, any Government support for individual industries should be provided on a competitive basis, allowing both new entrants and established producers to flourish. Sir Geoffrey shines a light on how the Government can work towards an ever-flourishing manufacturing future for the UK.”

Jo Gideon MP, Chair of the UK Ceramics Industry APPG

“This excellent history of British industrial strategy by Policy Exchange is a subject close to my heart. Triumph used to manufacture at a factory in my constituency, where my father used to work as a setter-operator on a Capstan lathe. At the time, British Industry was facing competition from Japanese imports. My father’s story, set within my brilliant West Midlands constituency, highlights the need for a consistent and predictable policy environment which allows our industries to grow and compete in a modern world.”

Khalid Mahmood MP, former Shadow Defence Minister and Labour MP for Birmingham Perry Barr

“Of the six Manufacturing plants I worked in (shop floor and management) between 1957-71 only one remains. They covered machine tools, weighing machines, loudspeakers, locomotives and buses. All exported. All too small. All lacked investment apparent to those working there. One went under due to way Ted Heath ‘saved’ Rolls Royce. Many more shut down for same reason. RR was headline, but the vital subcontractors were ignored. I still pay my subs to remain a Chartered Engineer, but having read Geoffrey Owen’s so accurate descriptions of the demise of the key sector I do it more out of commiseration than solidarity. This paper is a must read for policy makers who would be wise to talk to Owen and his contacts as they will not be experienced themselves. I certainly endorse his conclusions.”

Rt. Hon The Lord Rooker, member of the Economic Affairs Committee and former Government Minister

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Executive summary

In the last few years the world economy has been subjected to a series of shocks - the Covid-19 pandemic, the escalating trade war between the US and China, and most recently Russia's invasion of Ukraine. In response to these events and to other pressures, including the need to combat climate change, the United States and the European Union have adopted interventionist industrial policies. These policies are seen as a means of strengthening their domestic industries and reducing their dependence on outside suppliers in important sectors of the economy.

How should the UK react? Should the government imitate, albeit on a smaller scale, what the US and the EU are doing, or should it pursue a different sort of industrial policy?

In addressing these questions this paper looks first at the evolution of UK industrial policy over the last few decades – the “picking winners” era of the 1960s and 1970s, the retreat from state intervention under Margaret Thatcher and her successors, the revival of industrial policy after 2010, first under the Conservative-Liberal Democrat coalition (2010-2015) and then under Theresa May's Conservative government (2016-2019).

As things now stand, the future of industrial policy is uncertain. Theresa May's industrial strategy was scrapped by Boris Johnson's government and has not been formally replaced, although the present government has continued to intervene in some industries. Meanwhile the Labour Party, impressed by the apparent success of the Biden Administration's programmes, is committed to a policy of identifying key industries and supporting them with public funds.

In deciding on its next steps Rishi Sunak's government and its successor after the next election will need to consider what lessons can be learnt from recent American and European experience and how relevant they are to the UK.

This paper describes how France and Germany are providing generous subsidies to particular industries as part of the drive, strongly backed by the European Commission, for strategic autonomy; one of the largest recipients is the semiconductor industry, where European firms have been lagging behind their Asian competitors.

These policies have been criticised, especially in Germany. Liberal economists deplore what they see as a shift away from the generally non-interventionist stance which has served Germany well throughout the post-war period. There is also the fear that the pursuit of strategic autonomy could slide into protectionism.

In the US President Biden's industrial policy, which enjoys wide

bipartisan support in Congress, has come under attack on similar grounds. Some economists argue that subsidies will have a distorting effect, leading to over-investment in the favoured industries; they will also encourage an intense lobbying effort as companies seek access to government largesse. For America's trading partners the most objectionable feature of these policies is their "Buy American" provisions, which may encourage non-American firms to locate new factories in the US rather than at home.

This paper argues that the UK should not try to imitate what the US and the EU are doing. What is needed, in place of the erratic approach that has characterised UK industrial policy in the last few years, is a consistent and predictable set of policies on which the business community and investors can rely. Taking into account lessons from the UK's past experience and that of other countries, the paper suggests the following guidelines for any future UK industrial policy:

The UK should not enter into a subsidy race with other industrial nations.

The UK should build its industrial policy around horizontal, non-sector-specific, measures which support investment in all industries. These include, most importantly, government investment in research and development.

Where sectoral intervention is deemed to be necessary – for national security reasons, or to safeguard supplies of critical materials in areas such as health, or to promote decarbonisation – such intervention should have clearly defined objectives and be closely monitored.

The government should be wary of using the word "strategic" as a justification for sectoral intervention. If it does so, it must explain why one industry is more strategic than another.

As far as possible any government support for particular industries should be provided on a competitive basis, allowing scope for new entrants as well as established producers.

Introduction

To intervene or not to intervene: should governments give financial support to particular industries which for economic or other reasons they regard as essential to the nation's welfare, or should they rely mainly on horizontal, non-selective measures which benefit all industries, such as investment in skills or tax incentives to encourage firms to spend more on research?

This question has been the subject of debate among economists and policy makers for many years.¹ The debate has now become more heated, and a source of friction in international trade, as a result of recent developments in the US.

While the US has made occasional forays into interventionist industrial policy in the past, President Biden's legislative programme has taken intervention to an unprecedented level. Federal funds and other forms of support are being made available on a large scale for semiconductors, batteries and other industries which in the government's view need to be built up and expanded within the US.

This programme, especially its protectionist "Buy American" provisions, has prompted a critical response from the European Union. The EU has also been moving in an interventionist direction, based in part on concern about competition from China and the desire to achieve what it calls strategic autonomy. The issue now is whether further measures are needed to deter European companies from shifting investment to the US.

For the UK, what is happening in the US and the EU reinforces the need to end the uncertainty that has surrounded industrial policy in the last few years. The Conservative governments which have been in power since 2010 have veered from enthusiasm for industrial policy to periods of scepticism or hostility. The current government, led by Rishi Sunak, has intervened in some areas – for example, in subsidising investment in batteries for electric cars – but the Prime Minister has been criticised for not having a coherent approach to industrial policy.

The purpose of this paper is to examine, in the light of the changing global environment, what sort of industrial policy makes sense for the UK. It starts by tracing the conduct of UK industrial policy from the 1960s to the present day. It then looks at how industrial policy has evolved in France, Germany, the European Union and the US. The concluding section assesses the options open to the UK.²

1. For a recent survey see Réka Suhász, Nathan Lane, and Dani Rodrik, The new economics of industrial policy, Draft Paper for Annual Review of Economic Policy, August 2023.
2. In this paper the terms industrial policy and industrial strategy are used interchangeably. The paper also discusses science and innovation policy, which is closely linked to industrial policy.

Evolution of UK industrial policy

State-directed modernisation

Harold Wilson's Labour government entered office in 1964 at a time of increasing concern about the UK's economic performance – sluggish growth, declining share of world exports, and a persistent balance of payments deficit. The Prime Minister believed that these problems could only be solved through a “fundamental reconstruction and modernisation of industry”.³ This meant, among other things, an interventionist industrial policy.

The government set up two new ministries, the Department of Economic Affairs, which was to be a counterweight to the Treasury, and the Ministry of Technology. The latter's task was to restructure troubled industries such as shipbuilding, to support investment in new technologies such as computers, and to ensure that scientific advances made in British laboratories were exploited by British firms. The Ministry of Technology later took on other responsibilities, including aircraft production, to become in effect a Ministry of Industry.⁴

British industry, in the government's view, badly needed an injection of modern technology. In addition, many of the country's leading companies were too small to match the efficiency of their international rivals. This was part of Labour's argument for renationalising the steel industry; no British steel company had a capacity of over 4m tonnes a year, whereas Continental Europe had four such companies, the US eight and Japan five.⁵

To promote rationalisation in the private sector, the government set up the Industrial Reorganisation Corporation (IRC), whose role was to engineer mergers and acquisitions. The aim was to create national champions in strategic industries, and to narrow the gap with American giants such as General Motors and IBM. The results were generally disappointing, as in computers, and sometimes disastrous, most famously in the case of British Leyland Motor Corporation. This company was created in 1968 to bring together all the British-owned car makers in a single organisation; it collapsed in the 1970s and had to be taken over by the government.

The two new ministries did not last long. The Department of Economic Affairs, buffeted by economic storms, was absorbed into the Treasury in 1969. In 1970 the incoming Conservative government, led by Edward Heath, merged the Ministry of Technology with the Board of Trade to form the Department of Trade and Industry. This is the department which in one form or another – it has been renamed and reorganised several times (Table 1) – has been the principal link between Whitehall and industry.

3. Harold Wilson, *The Labour government 1964-70*, Penguin Books 1974, p24.

4. David Edgerton, *The “white heat” revisited: the British government and technology in the 1960s*, *Twentieth Century British History*, 7/1, 1996

5. Steel had been nationalised by the Labour government in 1949 and privatised by the Conservatives in 1954.

Table 1 Whitehall and industry*Changing names, changing responsibilities*

1874-1970	Board of Trade
1964-1970	Ministry of Technology
1970-1974	Department of Trade and Industry
1974-1992	Department of Energy
1974-1979	Department of Industry
1974-1979	Department of Trade
1974-1979	Department of Prices and Consumer Protection
1979-1983	Department of Industry
1979-1983	Department of Trade
1983-2007	Department of Trade and Industry
2007-2009	Department for Universities, Innovation and Skills
2007-2009	Department for Business, Enterprise and Regulatory Reform
2009-2016	Department for Business, Innovation and Skills
2016-2023	Department for International Trade
2016-2023	Department for Business, Energy and Industrial Strategy
2023-	Department for Business and Trade
2023-	Department for Energy Security and Net Zero
2023-	Department for Science, Innovation and Technology

The Heath government also closed down the IRC; interventionist industrial policy was largely off the political agenda. The major exception was the rescue of Rolls-Royce, the aero-engine maker, which had collapsed into receivership in 1971 as a result of a mismanaged contract to supply a new engine to an American aircraft manufacturer. Rolls-Royce was seen as too important as a defence contractor, and one of the few British-owned world leaders in advanced technology, to be allowed to fail, or to be taken over by a foreign firm.

The pendulum swung back when Labour returned to power in 1974. The shipbuilding and aerospace industries were nationalised, and the National Enterprise Board (NEB) was created to replace the IRC. Much of the NEB's energy was devoted to preserving "lame ducks", of which the biggest loss-maker was British Leyland. However, towards the end of Labour's second term industrial policy was shifting towards promoting new industries rather than propping up old ones. The NEB funded a new semiconductor firm, Inmos, as well as Celltech, a biotechnology company which was given exclusive access to discoveries made at the Laboratory of Molecular Biology in Cambridge.⁶

6. The background to Inmos is described by W. B. Willott, *The NEB's involvement in electronics and information technology*, in Charles Carter (ed), *Industrial policy and innovation*, Heinemann 1981. On Celltech, see Geoffrey Owen and Michael Hopkins, *Science, the state and the City*, Oxford 2016.

The Thatcher government

Margaret Thatcher's Conservative government, elected in 1979, took a radically different view of industrial policy. The Prime Minister believed in competition and open markets as the principal drivers of higher productivity. Part of the purpose of the privatisation programme was to force the managers of previously state-owned industries to compete for customers and for funds. Subsidies were cut back, and there was no special treatment for national champions. (A partial exception was the aircraft industry; the government retained a golden share in Rolls-Royce and British Aerospace after privatisation and continued to support civil aircraft projects.)

Mrs Thatcher was determined to reduce the role of government in the economy – hence the closure of the NEB and the early transfer of Inmos and Celltech to the private sector (both were later acquired by foreign companies) - but that did not imply leaving everything to the market. She continued to support British Leyland until parts of it were ready to be privatised. In 1987 she approved the ill-judged merger between what was left of that company (by then renamed Rover) and British Aerospace.

More important, Margaret Thatcher contributed to a partial revival of the British automobile industry by persuading Nissan to build a factory in the UK; Nissan's example was later followed by Toyota and Honda. The promotion of foreign investment, whether in the form of new factories or takeovers of British companies, was seen by the Prime Minister as a way of improving the UK's industrial performance – an approach that was maintained by subsequent governments, Labour as well as Conservative.

On innovation policy, Mrs Thatcher was criticised by some commentators for underinvestment in science and technology. She was willing to support basic scientific research, but beyond that she believed that the private sector should take over. "Innovation is best achieved by industry reacting to market forces without interference".⁷ This attitude was partly responsible for what some saw as a failure to identify and support technologies that might have strategic value, whether in terms of supply security or their potential economic importance.⁸ The government did agree, with some reluctance, to fund an attempt to strengthen the UK's position in information technology, through the Alvey programme, but that programme came to an end in 1988.⁹

A much-debated question is whether the Thatcher government's macroeconomic policies led to a loss of manufacturing jobs and output on a scale that could have been avoided, causing long-term-damage to the UK's industrial capacity. In the government's early years the combination of strict anti-inflationary policies and the increase in North Sea oil production pushed sterling to a level that caused severe problems for exporters. The share of manufacturing in GDP fell sharply in 1980s and 1990s. But that decline was not unique to the UK; France had much the same experience. There was a trend in most developed countries away from manufacturing towards services as a source of employment; another factor was the rise of low-wage countries, especially in Asia, as producers and exporters of manufactured goods.

7. David Edgerton and Kirsty Hughes, *The poverty of science: a critical analysis of scientific and industrial policy under Mrs Thatcher*, Public Administration, Vol 67 Winter 1990.

8. William Walker, *National Innovation Systems: Britain*, in Richard R. Nelson (ed), *National Innovation Systems: a comparative analysis*, Oxford 1993.

9. Brian Oakley and Kenneth Owen, *Alvey, Britain's strategic computing initiative*, MIT Press 1989.

While the legacy of Thatcherism is mixed, most though not all economists agree that the shift from subsidies and government intervention to competition and open markets, together with labour relations reform, was good for the economy and helped to halt the UK's relative decline vis-à-vis France and Germany. These measures also had the effect of setting UK industrial policy on a new path.

New Labour

When Tony Blair's Labour government took office in 1997 he had no intention of returning to a pre-Thatcher industrial policy, but he was determined to increase the rate of innovation in the economy. Gordon Brown, the Chancellor and later Prime Minister, was a great admirer of Silicon Valley and he urged UK universities to match what American universities were doing; he supported the creation of the Cambridge-MIT Institute, designed to transfer US-style attitudes and practices – especially in fostering spin-out firms – to the British university.

The government established the Technology Strategy Board to provide advice and financial support for small technology-based firms. Tax incentives for research and development were introduced. The government also commissioned a study which called for the creation of technology and innovation centres (partly based on Germany's Fraunhofer centres) to promote the commercialisation of scientific research.¹⁰

Most of Labour's support for industry was horizontal in character, designed to remedy market failures that affected all industries – for example, in the supply of finance for start-up and early-stage firms. However, towards the end of its time in office, when the world financial crisis struck and several major industries were in difficulty, the government moved in a more interventionist direction. This was what Peter Mandelson, Labour's Business Secretary, called market-based industrial activism - not a return to the policies of the 1960s and 1970s but a willingness to support growth sectors and to work closely with individual industries in improving their performance.¹¹ The creation of the Automotive Council, a joint government-industry body, was an example of the sort of partnership which Mandelson was seeking to promote.

The coalition government 2010-2015

This approach was taken further by the Conservative-Liberal Democrat coalition, led by David Cameron, which held office from 2010 to 2015. Vince Cable, Business Secretary in the new government, was convinced, as he wrote in a letter to the Prime Minister, that “market forces are insufficient for creating the long-term industrial capacities we need”.¹² The government should “show more leadership in identifying and supporting key technologies”.

This was a period in which sector-based industrial policy, which had been out of fashion since the 1980s (partly because of the influence of Thatcherism), was making a comeback in other European countries. The principal cause was the recession, but there was also growing concern

10. Hermann Hauser, The current and future role of technology and innovation centres in the UK, Department for Business Innovation and Skills, 2010.

11. Peter Mandelson, A new industrial activism, The RSA lecture, December 17, 2008.

12. Vince Cable, Letter to the Prime Minister on industrial policy, Department for Business, Innovation and Skills, February 8, 2012.

about Europe's failure to keep pace with the US in newer industries and about competition from China.¹³

Together with David Willetts, Minister of State for Universities and Science, Vince Cable set in train several programmes aimed at strengthening established industries and stimulating innovation in new areas. In the motor industry, for example, the government, after consultation within the Automotive Council, provided half the funding for the Advanced Propulsion Centre, charged with supporting the development of low carbon technologies which might replace the internal combustion engine. A support scheme was also put in place for the aerospace industry.

The Technology Strategy Board, which was renamed Innovate UK, was expanded, and Labour's plan for technology and innovation centres, now called Catapult centres, was implemented. The government set up the Biomedical Catalyst, a funding agency jointly run by the Medical Research Council and Innovate UK, to help young biotechnology firms navigate the so-called valley of death between the discovery of new therapies and commercialisation.

In an influential paper David Willetts identified "eight great technologies" which were likely to have a transformative impact on the economy and in which the UK, because of its strength in the underlying science, should be able to establish a competitive advantage.¹⁴ Through the Catapult centres and in other ways the government invested some £600m in these technologies.

How far the revival of industrial policy improved UK economic performance is hard to judge, since there was no comprehensive evaluation of the policy either by the coalition government or by its successor. The government acknowledged that the full impact might not be seen for a decade or more but pointed to what it saw as some signal achievements.¹⁵ These included what it had done in automobiles and aerospace, the expansion of the Catapult centres, the investment in the new technologies, and the creation of the British Business Bank, designed to improve the supply of finance for small business.

After the policy swings of the Wilson and Thatcher years, it seemed that by the time of the 2015 election, which was won by the Conservatives, an interventionist industrial policy had become an established part of the government's armoury. However, Sajid Javid, business secretary in the new government, took a different view from Vince Cable. Once described as a small-state Thatcherite, he was a passionate believer in free enterprise and doubtful about government intervention in industry. "I don't particularly like the word strategy coupled with industrial", he told an interviewer. "I thought it created an impression that there are certain sectors that the government wants to do well and other sectors it could not care about".¹⁶

Javid cut back some of the programmes that had been launched by Cable and Willetts. But the retreat from industrial policy lasted for little more than a year. The Brexit referendum in 2016 led to the resignation of David Cameron and his replacement as Prime Minister by Theresa May, who was to make industrial policy a centrepiece of her administration.

13. Philippe Aghion, Julian Boulanger and Elie Cohen, *Rethinking industrial policy*, Bruegel, June 2011.

14. David Willetts, *Eight great technologies*, Policy Exchange 2013. Willetts recently wrote a review of what had been achieved in the eight technologies in the ten years since his original paper. David Willetts, *The eight great technologies 10 years on: an industrial strategy?* Policy Exchange June 28, 2023.

15. *Industrial Strategy: early successes and future priorities*, Department for Business, Innovation and Skills, April 2014.

16. *Financial Times*, September 16, 2015.

Theresa May's industrial strategy

In 2017 Mrs May and her Business Secretary, Greg Clark, launched what they called a modern industrial strategy.¹⁷ The Business Department, which had been renamed several times since 1970, was given yet another title, the Department for Business, Energy and Industrial Strategy.

In line with the fashion in Europe and elsewhere for mission-oriented innovation and industrial policies, the new strategy was built around four “grand challenges”: artificial intelligence and data; clean growth; the future of mobility; and the ageing society.¹⁸ The government set in train a number of programmes within these four areas, financed through a new fund, the Industrial Strategy Challenge Fund. This fund was managed by UK Research and Innovation (UKRI), which had been set up to bring together in a single organisation all the research councils as well as Innovate UK.

In the case of mobility, for example, the Faraday Battery Challenge was launched. Its purpose was to develop a supply chain for the production of batteries for electric cars and thus encourage UK-based car assemblers to make their electric cars in the UK rather than elsewhere.¹⁹ This programme funded battery-related research through the newly created Faraday Institution and through Innovate UK; the government also supported the creation of the UK Battery Industrialisation Centre, a Midlands-based facility where makers of batteries and battery components could test their products in advance of commercialisation. The government hoped that, by making the UK a more attractive location for battery development, it would bring in investment from one of the leading Asian battery manufacturers.

A novel feature of Mrs May's strategy was the creation of a monitoring body, the Industrial Strategy Council. Chaired by Andy Haldane, a Bank of England economist, the Council filled a gap that had been a serious weakness in earlier industrial policies – the absence of independent appraisal. In its first annual report the Council was generally supportive of the strategy, though critical of what it saw as a lack of prioritisation; with no less than 142 different policy measures, it was trying to do too much.²⁰

The demise of industrial strategy?

Following Mrs May's resignation in 2019 and her replacement by Boris Johnson, her industrial strategy remained in place. Most of the programmes funded by the Challenge Fund were continued, as was the monitoring role of the Industrial Strategy Council. The new government also built on what Mrs May had started on climate change policy, launching an ambitious ten-point plan for “a green industrial revolution”; it promised investment in a range of low-carbon technologies, with the aim of reaching “net zero” by 2050.

Boris Johnson was not personally committed to his predecessor's industrial strategy, but he was widely seen as an instinctive interventionist, willing to use the power of the state to support potentially world-leading British firms. He was a strong supporter of Britishvolt, a start-up firm

17. Industrial strategy: building a Britain fit for the future, Department for Business, Energy and Industrial Strategy, November 2017.

18. A mission-oriented innovation policy has been defined in an OECD study as “a coordinated package of policy and regulatory measures designed to address a societal challenge”; Philippe Larrue, The design and implementation of mission-oriented innovation policies, OECD Science, Technology and Industry Policy Papers, February 2021. See also Mariana Mazzucato, Mission-oriented innovation policies: challenges and opportunities, Industrial and Corporate Change, October 2018

19. For the background to the battery programme, see Geoffrey Owen, Batteries for electric cars: a case study in industrial strategy, Policy Exchange April 18, 2018.

20. Industrial Strategy Council, Annual Report 2020, February 19, 2021.

which was developing batteries for electric cars. This company won a provisional government grant to help finance a large battery factory in the north of England, but it subsequently ran out of money and went into administration.

Johnson was a great enthusiast for science. Determined to make the UK a “science superpower”, he promised an increase in government spending on research and development to £22bn by 2024-25, almost double what was spent in 2019-20. This was described by the government as the largest and fastest ever expansion of support for basic research and innovation.²¹ (The £22bn target was later pushed forward to 2026-27.)

Some of the new money would go to a new funding agency, the Advanced Research and Invention Agency (ARIA), which was to support high-risk, potentially transformative projects that were outside the remit of existing government funders. ARIA was the brainchild of Dominic Cummings, who served as Johnson’s chief adviser from the 2019 election to the end of 2020. It was partly modelled on a much-admired American agency, the Defence Advanced Research Projects Agency (DARPA), which since its foundation in 1958 had contributed to an impressive number of technological breakthroughs.²² Although DARPA was part of the Department of Defence and its programmes were primarily aimed at military objectives, several of these breakthroughs had important civilian applications.

ARIA was to be an independent agency, separate from UKRI and not linked to the Industrial Strategy Challenge Fund.²³ But its launch came at a time when the Johnson government appeared to be losing confidence in industrial strategy – at least in the form that it had taken under Mrs May.

In March 2021 the government announced that the industrial strategy was to be closed down, along with the Industrial Strategy Council. No clear explanation was given. In place of the industrial strategy the government published what it called the Plan for Growth.²⁴ It was based on three pillars of growth: infrastructure, skills and innovation. It was followed a few months later by an innovation strategy, which listed seven “technology families”, including advanced materials and robotics, which were thought to offer opportunities for UK industry.²⁵

The follow-up to these decisions was thrown into some confusion in the second half of 2022 by political turmoil in Westminster. The resignation of Boris Johnson in June, followed by the short-lived tenure of his successor, Liz Truss, created uncertainty in the business community and among foreign investors about the management of the UK economy. During this period there were several leadership changes at the Business Department.

When Rishi Sunak took over as Prime Minister in October, he brought more order into government decision-making, but his views about industrial policy were largely unknown. What soon became clear was his enthusiasm – shared by his Chancellor, Jeremy Hunt – for science and technology. In February 2023 he decided to break up the Business Department and to create a new ministry, the Department for Science,

21. Financial Times, March 11, 2020.

22. Several of these breakthroughs had been made in the early years of DARPA, before the agency had become, in Cummings’s view, bureaucratised. Dominic Cummings, Evidence to Commons Science and Technology Committee, March 17, 2021.

23. ARIA was established as an independent research body in January 2023. By November it had appointed eight programme directors and had set in train several research programmes; one of them involved a novel approach to the way computers process information.

24. Build back better: our plan for growth, HM Treasury, March 3, 2021.

25. UK innovation strategy: leading the future by creating it, Department for Business, Energy and Industrial Strategy, July 2021.

Innovation and Technology. One of the department's first acts was to publish a Science and Technology Framework, which listed five "critical technologies" that would be given high priority: artificial intelligence, engineering biology, future telecommunications, semiconductors, and quantum technologies.²⁶

The Business Department, which as part of the reorganisation was merged with Department for Trade, was still responsible for what was left of Mrs May's industrial strategy. This included the battery programme, where the objectives set out in 2017 were some way from being achieved. The UK had failed to attract as much investment in gigafactories had been hoped, and there was concern, especially after the collapse of Britishvolt, that the future of the auto industry was at risk unless more such factories were built in the UK.

These anxieties were partially allayed when Tata, the Indian conglomerate which owns Jaguar Land Rover, announced its decision to build a UK gigafactory; the government had agreed to provide Tata with some £500m in grants and other forms of assistance. The Tata plant, when completed, would give the UK two gigafactories; the other was being built in the North East by Envision, a Chinese company, to supply Nissan. But the motor industry argued that the UK would need five gigafactories by 2030 if it was to complete the transition to electric cars. There was growing concern, even after the Tata decision, that the UK was still losing ground to its European competitors in a crucial part of the battery supply chain.²⁷

That the government was committed to supporting the battery sector was confirmed in November when the Department for Business and Trade published the UK Battery Strategy.²⁸ This document set out the steps that the government had taken, or was planning to take, to stimulate investment in all phases of the battery supply chain; many of these programmes had been started in 2017 under Theresa May's industrial strategy. While the document was welcomed by the industry, it left some questions unanswered, notably whether the government would be willing to subsidise the creation of new gigafactories on the same scale as it had done with the Tata project.

Time for a reappraisal

The battery issue had a wider importance. It was one of the sectors that was being subsidised on a lavish scale in the US and the EU. The question facing the Sunak government was how far the UK should move in the same direction.

In making decisions on industrial policy, the current government, and whatever new government takes over after the forthcoming election, will need to take into account the UK's past experience. Which interventions have worked well and which less well? What has Mrs May's industrial strategy achieved? These are questions that might have been put to the Industrial Strategy Council had it still existed. A complicating factor is the difficulty of separating the impact of industrial policy, for good or ill,

26. Science and Technology Framework, Department for Science, Innovation and Technology, March 2023.

27. House of Commons Business and Trade Committee, Batteries for electric vehicle manufacturing, HC 196, November 21, 2023.

28. UK Battery Strategy, Department of Business and Trade, November 26, 2023.

from other factors that have influenced the performance of a particular industry.

One of the industries that has attracted a good deal of attention from government in recent years is the life sciences sector. A succession of reports has identified several areas where the performance of the industry could be improved with government help – for example, through ensuring better collaboration with the National Health Service, and by increasing the supply of scale-up finance to small biotechnology firms. But this is an industry which has long been a British success, for reasons that have little to do with interventionist industrial policy.

The great leap forward was made in the 1970s and 1980s when Glaxo (now GSK) emerged as one of the world's leading pharmaceutical companies. Other British firms, notably ICI, whose pharmaceutical subsidiary was later spun off as Zeneca (now AstraZeneca), were also doing well. Since the 1990s the world pharmaceutical industry has been restructured through numerous mergers and acquisitions, but GSK and AstraZeneca have held their place among the industry leaders.

Referring mainly to the earlier period, a government-commissioned report attributed the pharmaceutical industry's success to a combination of factors: "outstanding science, much of it supported publicly, a science-based tradition of healthcare, many brilliant individuals, shrewd business decisions and a stable business environment". The study also noted that the NHS market had always been an open one, with no hint of a national champion policy.²⁹

Lessons from pharmaceuticals cannot easily be applied to other industries – it is exceptional in that the government is both the regulator and the principal customer - but the example shows that the success of an industry depends on a range of factors, only some of which are directly influenced by government. Sector-specific intervention may be helpful in tackling specific problems, but it is generally less important than broader policies that encourage investment in that industry.

29. Nicholas Owen, The pharmaceutical industry in the UK, in Learning from Britain's successful sectors: an historical analysis of the role of government, BIS Economics Paper No 6, March 2010.

Industrial policy in Europe and the US

As noted earlier, the revival of industrial policy in the UK after 2010 was matched in other European countries. The general trend has been towards more intervention, reinforced in the last few years by the Covid-19 pandemic, which exposed Europe's dependence on distant suppliers of vaccine ingredients and other medical products, and by the disruption in energy supplies that followed from the Ukraine war. There has also been growing concern about over-reliance on China for the supply of critical products such as batteries and battery components.

The next two sections look at how France and Germany have responded to these events.³⁰

France

Of the larger European countries France has been the most consistent proponent of an active, government-led industrial policy. In the immediate aftermath of the Second World War some of the “commanding heights” of the economy, including coal mining, public utilities and several large banks, were nationalised, as was Renault, the car maker whose owner had been accused of collaboration with the Germans during the war. But the principal driver of industrial modernisation in the early post-war years was Jean Monnet's Planning Commission, which promoted investment in basic industries such as coal, steel, electricity and railways.

By 1958, when General de Gaulle returned to power, France was on the way to becoming a modern industrial power. Jean Monnet, his biographer wrote, had “expanded the range of options open to all future French leaders.”³¹ De Gaulle's presidency (1958-1969), together with that of his successor, Georges Pompidou (1969-1974), marked the golden age of French industrial policy - an era of national champions and *grands projets*.

De Gaulle was determined to lift France into the front rank of industrial nations, to strengthen its military capabilities and to achieve technological independence. Industrial policy during this period has been described by Elie Cohen as High-tech Colbertism, a reference to Jean-Baptiste Colbert, who as First Minister of State in the reign of Louis XIV sought to strengthen French industry through tariffs and subsidies. The guiding principle was what Cohen calls offensive protectionism. “The sovereign state creates the means of accumulation of scientific and financial resources. It provides future national champions with grants, secures markets through public procurement policies, and prevents foreign entry”.³²

30. This section and the next two are partly based on Geoffrey Owen, *Industrial policy in Europe since the second world war: what has been learned?* ECIPE January 2012.

31. François Duchêne, *Jean Monnet, the first statesman of interdependence*, Norton 1994.

32. Elie Cohen, *Industrial policies in France: The Old and the New*, *Journal of Industry, Competition and Trade*, Vol 7, 2007.

The 1960s saw a wave of mergers and acquisitions, some of them promoted by government. The objective was partly to achieve economies of scale, but concentration also made it easier for the planners in Paris to establish a close rapport with the leading companies in each industry. “To a degree present in few other nations, the management of French industrial strategy became a cooperative endeavour between civil servants and industrialists.”³³

The record of the *grands projets* was mixed. The successes were in sectors where the government or one of its agencies was the instigator of the project, provider of funds and principal customer. An outstanding example was nuclear power, which was handled far better in France than in the UK. In 1975 the French government wisely decided to abandon the nationally designed gas-cooled reactor in favour of the American pressurised water reactor; the licence from Westinghouse was the basis for an ambitious programme of nuclear power station construction. The UK, whether through misplaced patriotism or technical incompetence, chose a British design, the Advanced Gas-cooled Reactor, and stuck with it for far too long, despite growing evidence that the technology was flawed. It was a costly mistake from which the British nuclear power programme never fully recovered.³⁴

In industries where the end-users were dispersed and less influenced by government, the French approach worked less well. Nowhere was this clearer than in computers, where the attempt to create a French rival to IBM was an expensive failure. The programme had started in 1966 with the creation of a national computer company, *Compagnie Internationale pour l’Informatique* (CII), out of three small computer businesses. CII was supported with subsidies and preferential procurement, but it was never able to make much impact in the computer market. There was a brief attempt in the early 1970s to find a European solution; a new company, *Unidata*, was created, bringing together CII in France with the computer interests of Siemens in Germany and Philips in Holland. But disagreements between the partners over product strategy and organisation proved irreconcilable, and the company was closed down.

Much more successful was the Airbus, based on collaboration between French, German and later British and Spanish companies. (The UK government pulled out in 1969, although British participation continued through a private arrangement with Hawker Siddeley.) After a difficult start Airbus became a formidable rival to Boeing, and, in contrast to the Anglo-French Concorde supersonic airliner, it was a commercial success. It came to be seen as a triumph for European industrial policy, although the character of the large civil airliner business, with its huge scale economies and high barriers to entry, leading to two or at most three companies dominating the world market, made the Airbus model less applicable to other industries.³⁵

Despite what happened in computers and some other disappointments, the period between 1958 and 1974 is generally regarded as a success for French industrial policy. The next few years were more difficult. When

33. Peter Hall, *Governing the economy*, Polity Press, 1986, p167.

34. Simon Taylor, *Privatisation and financial collapse in the nuclear industry: the origins and causes of the British energy crisis of 2002*, Routledge 2007.

35. Paul Seabright, *National and European champions - burden or blessing?* CESifo Forum 2/2005.

Valéry Giscard d'Estaing took over the presidency (1974-1981), the economy was in the throes of the deep recession that followed the first oil crisis. Giscard, with his Prime Minister Raymond Barre, while still willing to support growth sectors, wanted to liberalise the economy and to reduce French industry's dependence on the state. But he was soon faced with rising unemployment and threatened plant closures in older industries such as steel and shipbuilding, which demanded state intervention. Giscard's response was seen as inadequate, paving the way for the victory of the Left, led by François Mitterrand, in the 1981 presidential election.

Mitterrand promised to lift the economy out of recession and to use the power of the state to rebuild and modernise French industry. The first step was a programme of nationalisation in which thirteen of the country's largest companies were taken over by the state. This was accompanied by an over-optimistic dash for growth which soon ran aground in the face of a currency crisis. In 1983 Mitterrand was forced into a drastic U-turn, with a freeze on prices and wages, higher taxes and cutbacks in public spending.

When the right-wing coalition led by Jacques Chirac won the legislative elections in 1986, the nationalisation programme was put in reverse. Although Mitterrand won a second presidential term, the days of socialism in one country seemed to be over. In 1995 he was succeeded as president by Chirac, who remained in office until 2007.

During this period changes were taking place at the European level which were to have a profound impact on French industrial policy.³⁶ A crucial event, in which the Thatcher government had played an important role, was the creation of the European Single Market, which came into force in 1993. The reduction of trade barriers within what was then the European Economic Community, together with strict rules on competition and on state aids to industry, limited the ability of governments to subsidise their national companies. The impact on France was reinforced at the end of the decade by the launch of the euro, which removed a policy option – the devaluation of the currency – that had been a regular feature of French economic management for much of the post-war period.

The challenge for France was how to preserve at least some elements of the old industrial policy within the constraints imposed by the single market rules. This did not imply a conversion to Thatcherism. In contrast to the UK, the French government retained a stake in many of the privatised companies; Renault, for example, was privatised in 1996 with the state holding 44 per cent of the shares, later reduced to 25 per cent. The government continued to see itself as the protector of large, strategically important companies.

In 2004 a financial crisis at Alstom, one of the country's largest industrial groups, prompted a government rescue, approved after lengthy argument by the competition authorities in Brussels. In the same year the government intervened to prevent the takeover of the pharmaceutical company, Aventis, by the Swiss firm, Novartis; the outcome was an agreed merger between Aventis and a smaller French pharmaceutical company,

36. Pierre-André Buigues and Elie Cohen, *The Failure of French Industrial Policy*, *Journal of Industry, Competition and Trade*, February 2020.

Sanofi-Synthélabo.³⁷

Industrial policy under the Chirac government included the creation of a new agency, Agence de l'innovation industrielle, to support advanced technology projects. The aim was to replicate France's earlier successes such as Airbus and Ariane, but the performance of the new agency was disappointing. A notable failure was the attempt to establish a search engine, known as Quaero, which was intended to be a European counterpart to Google. Another initiative was the creation of regional competitiveness clusters, bringing together firms, universities and other institutions to support and expand local industries.

Chirac's successor, Nicolas Sarkozy (2005-2012), had to contend with the recession that followed the world financial crisis. He did so with a range of industrial policy initiatives that included another new agency, the Fonds Stratégique d'Investissement (FSI), to support companies that were seen as critical to the competitiveness of the French economy. Sarkozy's aim was to increase industrial production by 25 per cent in five years and to return to a trade surplus in manufactured goods.³⁸

Sarkozy had entered office with a promise to liberalise the economy, but his industrial policies were not dissimilar to those of his Socialist successor, Francois Hollande (2012-2017). One of Hollande's first decisions was to merge Sarkozy's FSI into what became known as Bpifrance (originally called Banque Publique d'Investissement). This agency was structured in a way that did not fall foul of EU state aid rules; it acted as a private equity or venture capital fund, not as a source of subsidised loans for distressed firms.³⁹ It has continued to operate under the Macron presidency, with a wide portfolio mainly based on support for early-stage, high-growth firms, but also including some large companies.⁴⁰

Hollande claimed that his approach to industrial policy was pragmatic – “neither Rhinelandish nor Anglo-Saxon.”⁴¹ In 2014 he agreed to the rescue of Peugeot-Citroen, which had been hit hard by a collapse in car sales; as part of a financial reconstruction the government acquired a 14 per cent equity stake. However, against fierce protests from some of his colleagues he approved the sale of Alstom's power generating business to General Electric of the US; he also allowed the sale of Alcatel-Lucent, a large manufacturer of telecommunications equipment, to Finland's Nokia.⁴²

Emmanuel Macron was Minister of Economics in the Hollande administration when the Nokia deal went through. He told an interviewer that in an era of global competition France could no longer take a “romantic” approach to rebuffing foreign takeovers. Alcatel-Lucent, he pointed out, was more of a global than a French company. “Its main markets are China and the US, its ownership is foreign, most of its managers aren't French”.⁴³ But Macron was also a strong believer in building European industrial champions, and this was an issue which acquired greater prominence during his presidency.

In 2017 Siemens and Alstom announced a plan to combine their railway equipment activities. (This was now Alstom's principal business, following the earlier deal with General Electric.) The merger was prompted in part

37. Aventis had been formed in 1999 by a combination of the pharmaceutical businesses of Rhône-Poulenc in France and Hoechst in Germany.

38. Jonah D. Levy, *The return of the state? French economic policy under Nicolas Sarkozy*, August 2011, APSA 2011 Annual Meeting Papers.

39. Matthias Thiemann and Peter Volberding, *The rise of Bpifrance: the rebirth of a dirigiste state?* In Daniel Mertens, Matthias Thiemann and Peter Volberding (eds), *The reinvention of development banking in the European Union: industrial policy in the single market and the emergence of a field*, Oxford Academic March 2021.

40. Bpifrance holds a 7.4 per cent stake in Alstom and 6 per cent in Stellantis, the company formed in 2021 by the merger between PSA Peugeot-Citroen and Fiat Chrysler.

41. Financial Times, September 12, 2013.

42. Alcatel had originally been part of one of France's national champions, Compagnie Générale d'Electricité. It had merged with Lucent in the US in 2006.

43. Financial Times, April 21, 2015.

by the need to counter competition from China, but it was also seen as a demonstration of European industrial solidarity. The chief executive of Siemens said: “The Franco-German merger of equals sends a strong signal in many ways. We put the European idea to work.....and we are creating a new European champion for the long term”.

Although the proposal was supported by the French and German governments, it was blocked by the EU competition authorities on the grounds that it would significantly reduce competition in Europe, that the two companies were big enough on their own to compete in world markets and that the threat from China was exaggerated.⁴⁴

There was a furious reaction to this ruling in France and Germany. It ran counter, not only to Macron’s views, but also to those of the German Minister for Economic Affairs, Peter Altmaier, who had come to believe that more European champions were needed and that EU competition rules should be amended to make that possible.

Altmaier’s proposals for a new European industrial policy, which are described in the next section, were much criticised in Germany, and not all of them were implemented. Over the next few years, however, partly in response to external events, including the US-China trade war, industrial policy in the EU did move in an interventionist direction, with strong support from France.

For Macron, this was part of a new and thoroughly welcome consensus in the European Union on the need to strengthen European sovereignty. “Industrial policy”, he said, “has long been taboo. But in the last few months we have revamped this old concept and turned it into a powerful lever to meet the challenges of the ecological and digital transitions as well as to match the ambition of our partners and rivals”.⁴⁵ The pursuit of strategic autonomy is part of the motivation for the recent investments, in France as well as in Germany, in semiconductors and batteries, two sectors in which Europe has a weak competitive position.

How far the revival of industrial policy at the European level will improve French economic performance is an open question. As noted earlier, there has been a general trend in the advanced industrial countries for the manufacturing sector to decline as a proportion of GDP. But the impact in France has been more severe than in any other European country except the UK. The comparison with Germany is stark; between 2010 and 2019 the French economy lost 500,000 manufacturing jobs, while Germany gained 300,000.⁴⁶

According to a study published in 2020 by France Stratégie, a government-backed policy institute, the two principal factors that have contributed to the decline of French industry have been a lack of cost competitiveness and high taxation. This was responsible for a fall in investment in plant and machinery and a tendency for companies to shift more of their production outside France. “Large French companies became the champions of relocation, enabling them to maintain their competitiveness at world level, though at the expense of industrial employment in France”.

44. EU Industrial policy after Siemens-Alstom, European Political Strategy Centre 2019.

45. Emmanuel Macron, Europe needs more factories and fewer dependencies, Financial Times, May 12, 2023.

46. Piere-André Buigues and Elie Cohen, The failure of French industrial policy, op cit.

The impact of sectoral industrial policy, according to the study, had been disappointing, except in a few areas such as aeronautics and space.⁴⁷ The study also noted that France was unusual among industrial countries in the extent which the government held an ownership stake in major companies; this appeared to have done nothing to strengthen French industry.⁴⁸

The France Stratégie study was not dismissive of industrial policy; government intervention was essential to combat climate change and to help industry manage the digital transition. But it had to be accompanied by other policies - improvements in the fiscal environment, more investment in training, stronger incentives for innovation and the promotion of venture capital.

Germany

For most of the post-war period French-style industrial policy has played virtually no role in Germany. The economic miracle that began in the 1950s was underpinned by a broader set of “ordoliberal” policies: a strong focus on competition; the promotion of free trade; a limited role for government; and a stable fiscal and monetary framework. German industry also benefited from supportive institutions, including a well-organised vocational training system and close cooperation between banks and industry, which was especially helpful for small and mid-sized firms.

The industries which made the biggest contribution to Germany’s export success were for the most part ones in which Germany had a long-established competitive advantage, such as chemicals, electrical engineering and machinery. Another big winner was the motor industry, which had been something of a laggard before the war. Volkswagen, BMW and Daimler-Benz took full advantage of the export opportunities opened up by the reduction of tariffs that followed the creation of the European Economic Community.

A partial exception to Germany’s non-interventionist stance was the aircraft industry, thanks in part to Franz-Josef Strauss, who as Federal Minister of Defence from 1956 to 1962 and later as Minister President of Bavaria (where several of the aircraft companies were based) worked hard to revive the industry. Most of the manufacturers were brought together in a single group, which became the German partner in Airbus.

For the most part Germany’s strength lay in industries where technical change was incremental rather than radical. These industries, as Henry Ergas has written, tended to set the technological agenda. “They determine the direction of research, dominate the process of standardisation, and have a large role in the training and education policies. Entirely new industries and technologies may find it difficult to capture the attention they deserve”.⁴⁹

Although pre-war Germany had an impressive record in science and technology, and a number of companies that were leaders in science-based industries such as AEG and Siemens, progress in in these areas was slow after the war. This was partly due to the restrictions on defence-

47. France Stratégie, Industrial policies in France: developments and international comparisons, November 2020.

48. The portfolio of the Agence des participations de l’Etat consists of 83 entities, including some large industrial companies (Airbus, Renault, Safran, Thales) as well as utilities such as EDF and Engie.

49. Henry Ergas, The importance of technology policy, in Partha Dasgupta and Paul Stoneman (eds), Economic policy and technological performance, Cambridge 1987.

related work imposed by the Allied authorities; whereas in the US military demand was a powerful stimulus for industries such as semiconductors, that market was virtually non-existent in Germany.

Another obstacle was a bank-dominated financial system which was ill-equipped to foster entrepreneurial start-up firms. Such firms were the principal drivers of American leadership in areas such as information technology and biotechnology; there were very few counterparts in Germany. A rare exception was SAP, the software firm which was founded in 1972 as a breakaway from IBM and later became a world leader. Starting and building this sort of business was harder in Germany than in the US. Germany lacked a venture capital industry that was willing to back untried entrepreneurs and a stock market that allowed early-stage investors to exit.

In 1975, to correct what was seen as both a technology gap and an equity gap, the government encouraged the banks to set up a new venture capital fund, the Deutsche Wagnisfinanzierungsgesellschaft (WFG). The experiment failed, partly because of poor governance but also because WFG was unable to attract entrepreneurs who had the ability and motivation to turn their ideas into a viable commercial business. A study of WFG blamed cultural factors. Most university academics, the study pointed out, had no interest in commercialising their discoveries, while young graduates generally sought to join large companies and banks, which typically provided lifetime employment at high wages and excellent benefits. To start a new business and fail would be financially ruinous as well as damaging for their reputation.⁵⁰

One bright spot in the 1990s, after reunification, was the emergence of Dresden as a leader in semiconductors. This city, which had been the principal microelectronics centre in Communist East Germany, attracted substantial investment from semiconductor firms, strongly promoted by Kurt Biedenkopf, who was Minister-President of Saxony from 1990 to 2002.

Much less successful was an attempt to create a German counterpart to NASDAQ, the New York-based stock market on which many of America's fast-growing technology firms had listed their shares. Created in 1997, Germany's Neuer Markt had less onerous listing requirements than the main Frankfurt stock exchange, and it attracted several early-stage firms in biotechnology and other science-based industries. However, too many of them made promises that they were unable to keep. Investors lost confidence in the market, and it was closed down in 2003.

Over the next few years the government introduced a series of measures aimed at improving access to finance for early-stage firms. This helped to stimulate the growth of the venture capital industry, although it has remained much smaller than its British counterpart.

In 2006 the Ministry of Education and Research introduced the High-Tech Strategy, described as "the first national strategy to show how Germany can become and remain a global leader in the most important cutting-edge technologies". Instead of using public funds to support basic and applied research across the board, the new strategy was more selective,

50. Ralf Becker and Thomas Hellman, The genesis of venture capital – lessons from the German experience, CESifo working paper No 883, March 2003. See also Caroline Fohlin, The venture capital divide: Germany and the United States in the postwar era, SSRN, August 2016.

focusing support on a small number of missions. The Expert Commission on Science and Technology, which was established in 2007, described the High-Tech Strategy as marking “a completely new orientation for research and innovation policies”.⁵¹

The strategy was subsequently refined and adapted, and government funding for research and innovation was increased. There were also institutional changes, including the creation in 2019 of the Federal Agency for Disruptive Innovation (the German acronym is SPRIND).⁵² Like ARIA in the UK, it was partly modelled on DARPA in the US and given the task of supporting transformative innovation. Based in Leipzig and run by a successful entrepreneur, SPRIND was handicapped at the start by over-intrusive monitoring on the part of its two sponsoring ministries, the Ministry for Education and Research and the Ministry for Economic Affairs, but this handicap has recently been removed through the SPRIND Freedom Act, which gives the agency greater autonomy and widens the range of financial support that it can offer.

Meanwhile German industrial policy was entering a new phase. As noted in the last section, the rejection by the EU competition authorities of the proposed Siemens-Alstom railway equipment merger prompted a fierce debate in which Peter Altmaier, Minister for Economic Affairs in Angela Merkel’s Christian Democrat government, played a prominent role.

The Siemens-Alstom ruling reinforced Altmaier’s view that Germany and the European Union needed a new industrial policy. In February 2019 he set out an ambitious programme of reform, based on the view that global economic forces, including the rise of China, demanded a more active role for the state. “If the market forces within a country’s economy cannot maintain its innovative strength and competitiveness”, Altmaier said, “then it is the responsibility and task of the state to step in”. He argued for designating specific German firms as national champions, modifying EU competition law to facilitate the creation of larger European companies, and providing support for strategically important industries.⁵³

The proposals were attacked by liberal economists as a return to economic nationalism, and a repudiation of the principles that had served Germany well for several decades⁵⁴. They were described by one commentator as marking a decisive shift from a predominantly horizontal and technology-neutral industrial policy towards an interventionist approach.⁵⁵ But Altmaier also had supporters, notably in France.

Shortly after he had unveiled his strategy, he joined with his French counterpart, Bruno LeMaire, in launching a Franco-German manifesto on European industrial policy. This called for a review of the EU’s merger guidelines to take more account of global competition; it suggested that in some circumstances the European Council should have the power to override rulings by the EU competition authorities. There should also be stronger EU powers to screen and if necessary to block the sale of European companies to foreign acquirers.

Not all Altmaier’s reforms were implemented, but the trend towards a more interventionist industrial policy has been maintained under

51. EFI Annual Report 2017.

52. The full title is Bundesagentur für Sprunginnovationen.

53. National industrial strategy 2030, strategic guidelines for a German and European Industrial Policy, Federal Ministry for Economic Affairs and Energy, February 2019.

54. Jeromin Zettelmeyer, The return of economic nationalism in Germany, Peterson Institute for International Economics, March 2019. See also Christoph Schmidt, Peter Altmaier’s industrial strategy is a wrong turn for Germany, Financial Times, February 14 2019.

55. Etienne Schneider, Germany’s industrial policy 2030: EU competition policy and the crisis of new constitutionalism, New Political Economy, 28/2 2023.

Germany's coalition government, which took office in 2021. This is partly linked to the drive for decarbonisation, which had started earlier, and the need to boost investment in green technologies. But there was also anxiety about Germany's dependence on distant and not necessarily reliable suppliers of critical materials and components. This was underlined by the semiconductor shortage, the Covid 19 epidemic, and – most important of all – the Ukraine war and the consequent disruption of energy supplies.

How to respond to these challenges has been a controversial question. While the need to strengthen Germany's resilience in some areas is widely accepted, there is criticism of what is seen as over-reliance on subsidies to selected firms, an un-German practice which runs counter to the traditional approach to industrial policy. In particular, the government has offered generous subsidies to German and non-German semiconductor firms to build large fabrication plants in Germany. Two of the biggest recipients are Intel from the US and TSMC from Taiwan.⁵⁶

These investments, some critics argue, involve a misallocation of resources and the risk of an escalating international subsidy war. There is also a fear that, with richer countries like Germany capable of subsidising on a larger scale than other EU members, the integrity of the single European market could be undermined. Far better, according to this view, to concentrate on non-selective measures to make Germany a more attractive location for new investment.

Industrial policy at the EU level

In the early years of the European Economic Community the Commission in Brussels played little role in industrial policy. There were some moves towards cross-country collaboration, as in the Airbus project, but these were inter-governmental arrangements, not involving the Commission. It was the crisis in the steel industry in the second half of the 1970s that prompted a search for European solutions, leading to an agreed reduction in steel-making capacity and the stabilisation of prices. The programme was masterminded by an energetic Industry Commissioner, Etienne Davignon, who went on to argue for closer European cooperation, not just in troubled industries but also in newer, high-growth sectors.

The largest of several initiatives launched in the 1980s was the European Strategic Programme for Research in Information Technologies (ESPRIT). Partly modelled on Japan's Fifth Generation Computer programme – Japan was then much admired as a successful exponent of industrial policy – ESPRIT was focused on pre-competitive research. It was a step towards the broader Framework Programme (later renamed Horizon Europe), which became the Commission's principal instrument for channelling funds into collaborative research.

More important was the Single Market programme, designed to liberalise intra-European trade by removing tariffs and other barriers. This was part of a liberalising tide that was then running strongly, with the US rather than Japan as the model to be emulated. In a paper published in 1992 the Commission set out an approach which had an almost Thatcherite tone.

56. Guy Chazan, Germany's new chip factories: a bet on the future or a waste of money? Financial Times, May 12, 2023.

“In the 1970s industrial policy was characterised by a dirigiste and sectoral approach. Today it is recognised that public interventions in this area must take the form of horizontal activities” to improve the competitiveness of European industry.⁵⁷

This approach was embedded in the Lisbon agenda, adopted by member states in 2000; the aim was to make the European Union “the most competitive and dynamic knowledge-based economy in the world”. However, the response was less than had been hoped. This was due, according to a Commission report, to an overloaded agenda, poor coordination, conflicting priorities and the lack of determined political action. There had been insufficient investment in R & D and “an indifferent capacity to transform research into commercial products”.⁵⁸

This last weakness - the failure to use Europe’s scientific research as the basis for fast-growing firms in new industries - was seen as a European problem which urgently needed to be tackled. As another report noted, “Europe has traditionally performed better in strengthening century-old companies than helping the young and innovative ones to succeed”.⁵⁹

Another strand in the reappraisal of industrial policy was disappointment with the impact of the single market programme, and a sense that horizontal policies needed to be supplemented by more sectoral intervention. Pointing to changes in the world trading environment and to societal challenges such as climate change and the ageing population, the Commission declared in 2020 that “the necessary transition to a more sustainable, inclusive and resource-efficient economy will have to be supported by both horizontal and sectoral policies at all levels”.

During this period the concept of strategic autonomy was gaining ground. New EU initiatives included what were called Important Projects of Common European Interest (IPCEI), through which two or more national governments, working together, were given an exemption from state aid rules to fund projects that would contribute to growth, jobs and competitiveness in Europe. The first IPCEI project, for microelectronics, was approved in 2019. It was in part a response to the semiconductor shortage which had severely affected some customer industries such as automobiles. The broader aim was to strengthen an industry that had fallen behind its international competitors. The second IPCEI project, for batteries, was motivated by the desire to reduce Europe’s dependence on batteries from Asia.

Support for semiconductors was extended in 2022 with the European Chips Act, which was in part a response to President Biden’s CHIPS and Science Act. One of its aims was to increase Europe’s share of world semiconductor production from 10 per cent to 20 per cent.

The Chips Act, according to one assessment, “marks the biggest shift in terms of EU industrial policy as the Commission is encouraging EU countries to use state aid for subsidies, via rules specifically created for one end-user”.⁶⁰ The Act has been criticised for focusing support on large fabrication plants to make cutting-edge chips for which European demand is limited; the principal European semiconductor market is for

57. Research after Maastricht, European Commission April 9, 1992.

58. Facing the challenge: the Lisbon strategy for growth and employment, Report from the high-level group chaired by Wim Kok, November 2004.

59. Emmanuelle Maincent and Lluís Navarro, A policy for industrial champions: from picking winners to fostering excellence and the growth of firms, European Commission, Industrial Policy and Economic Reform papers No 2, 2008.

60. Niclas Frederic Poitiers and Pauline Weil, Fishing for chips, IFRI July 8, 2022.

less advanced chips used in industrial and automotive applications, not for the high-end chips used in mobile phones and other electronic devices where demand and production are mostly concentrated in Asia.

A few months later came the Net Zero Industry Act, which provides broad support for green technologies, including batteries, heat pumps and carbon capture and storage. The aim is to raise the EU's manufacturing capacity in these technologies to at least 40 per cent of European demand by 2030.

Some critics doubt whether the 40 per cent target is feasible or appropriate; they also question the Commission's over-selective approach, supporting a set of predefined technologies which may turn out to be wrong choices. "Cleantech investors", these authors conclude, "face many of the same barriers that constrain other categories of private investment in Europe, including access to finance, high energy costs, policy fragmentation and scarcity of critical skills. Addressing these barriers may be more useful, even from the narrow perspective of promoting cleantech, than giving preferential treatment to cleantech projects".⁶¹

More generally, there are questions about how far the pursuit of strategic autonomy can or should be extended, especially in industries like semiconductors where European self-sufficiency is not feasible; the quest for autonomy could slide into protectionism. As several economists have argued, there are dangers that these policies may distract attention from other priorities, most importantly the need to deepen the single market.⁶²

Industrial policy in the US

How to catch up with the US – in productivity, in innovation, and in overall industrial strength – has been a constant preoccupation for European policy makers throughout the post-war period. While there have been times when Japan was much admired, the US remains unsurpassed in its ability to exploit new technological opportunities and to foster world-leading technology-based companies. How much has industrial policy contributed to this achievement?

In a recent review of US industrial policy between 1979 and 2020 two American economists from the Peterson Institute looked at 18 case studies of government intervention and assessed them on three criteria: the effect on US competitiveness in global markets; whether the annual cost per jobs saved or created in the sector was reasonable; and whether support from government advanced the technological frontier.

Among the clear failures was the Synthetic Fuels Corporation, an attempt by the Carter Administration in 1980 to promote coal gasification as a way of tackling the energy crisis. In the middling category was Sematech, designed to counter Japanese competition in semiconductors: it scored well on advancing the technology, less well on the other two criteria. A big success on all three counts was Operation Warp Speed, the vaccine programme launched in 2020.⁶³ This was an example of a competition-friendly industrial policy, based on support for competing technologies and competing firms; the winners were not the established

61. Simone Tagliapietra, Reinhilde Veugelers and Jerome Zettelmeyer, *Rebooting the European Union's Net Zero Act*, Bruegel, June 22, 2023.

62. Clemens Fuest, *ifo viewpoint 244: Europe's industrial policy and the response to IRA*, March 21, 2023.

63. Gary Clyde Hufbauer and Euijin Jung, *Scoring 50 years of US industrial policy 1970-2020*. Peterson Institute of International Economics, November 2021

vaccine makers, but small biotechnology firms – principally Moderna in the US and BioNtech in Europe.

The Peterson study concluded that by far the most successful form of industrial policy was government support for public and private R & D. “One reason is US strength, backed by major universities, in research endeavours. Another reason is the US tradition of giving scope and support for competing scientists to pursue the same objective. A third reason, for public R & D, is the practice of allowing private firms to commercialise findings, typically with no or modest royalty payments to the government”.

The main findings of the study are that: industrial policy can save or create jobs, but often at a high cost; import protection seldom pays off; designating a single firm to advance technology yields inconsistent results; and R & D industrial policy has the best track record by far.

The study has special praise for DARPA, the defence-related agency which meets the three criteria with flying colours. “Without question”, the authors write, “DARPA is the US model for frontier industrial policy”. As noted in earlier sections, attempts to replicate DARPA are being made in the UK and Germany; there have also been calls to create a European DARPA.⁶⁴ Yet DARPA, which has been in existence since 1958, has a distinctive history and a distinctive role in the US innovation system. While lessons can certainly be learned from the way DARPA is organised, it will not be easy to transfer its culture and style to other countries.

Moreover, DARPA is only one of a number of agencies, public and private, which fund research in the US; the diversity of funding sources is one of the strengths of the American innovation system. There are other factors underpinning US success which are at least as important as DARPA: vigorous internal competition, strong links between universities and industry, easy access to capital for entrepreneurial firms from start-up through to commercialisation, generous government support for scientific research, and access to a huge, tariff-free domestic market.

Through the CHIPS and Science Act and the Inflation Reduction Act, President Biden is embarking on an industrial policy that is relatively new to the US. There can be no certainty that it will succeed. Quite apart from its protectionist element, the programme may lead to overcapacity and inflated costs in several industries. It also suffers from too many objectives - to create jobs, to revive manufacturing, to encourage unionisation, to reduce carbon emissions, to lessen the country’s dependence on China – some of which could be tackled more effectively in other ways.

Larry Summers, a former US Treasury Secretary, while supporting measures to promote decarbonisation and to improve security of supply in semiconductors, deplors what he calls “the doctrine of manufacturing-centred economic nationalism”, which he thinks underlies President Biden’s industrial policy. Another former government official, Robert Zoellick, fears that the proliferation of subsidies will generate more lobbying from special interest groups, as they compete for access to government largesse.⁶⁵

64. Philippe Aghion, An innovation driven industrial policy for Europe, in Simone Tagliapietra and Reinhilde Veugelers, Sparking Europe’s new industrial revolution, Bruegel, 2023.

65. Laurence Summers and Robert Zoellick in conversation, Peterson Institute, July 25, 2023.

In a different camp is David Autor, an economist who has written extensively about the impact of imports from China on US manufacturing. Pointing to decades of lost industrial capacity, he supports a pro-manufacturing industrial policy. While he accepts that pursuing industrial policy has risks, “forswearing industrial policy has equally many risks, especially when our chief economic and strategic competitors are currently using it to great effect”.⁶⁶

Meanwhile Biden’s programme is generating a surge of investment, from American and non-American firms, in the favoured industries.

66. David Autor, Letter to the Economist, July 29, 2023.

Conclusion

Recent industrial policy initiatives in the US and the EU have provoked mixed reactions in the UK. Some fear that the outcome will be an unproductive subsidy race. Others, such as Andy Haldane, former chairman of the Industrial Strategy Council, think that the new, more activist industrial policies will provide a much-needed boost for manufacturing. “Most arms races leave no one better off”, Haldane has written. “Today’s race to reindustrialise is different. It may be just the impetus the world needs to break free of its economic and environmental torpor”.⁶⁷

Among UK politicians an enthusiastic supporter of what is now called Bidenomics is Rachel Reeves, Labour’s Shadow Chancellor. Government, in her view, should identify the industries that are vital to its national interests, and that need public backing.⁶⁸ That is what the US has done, using subsidies, grants and loan guarantees to encourage investment in chosen sectors. A return to active industrial strategy, Reeves argues, is essential if Britain is to rebuild its productive capacity.

Others are sceptical, questioning whether it makes sense for the UK to imitate, albeit on a smaller scale, what the US is doing. Adam Posen, an American economist who was a member of the Bank of England’s Monetary Policy Committee, argues that the UK should not engage in a manufacturing subsidies war but should build on its strengths. “The UK”, he says, “should lean into being the best place to benefit from business services, higher education, cultural exports and some forms of R & D”. The logical course for the UK is to be “the English language, rule-of-law, stable place that is conducive to work in fields that engage in higher education, that do not require large, fixed capital investment, and that benefit from the ongoing globalisation that will continue, whatever happens between China and the US”.⁶⁹

Posen’s prescription may be regarded by advocates of industrial policy as far too unambitious. They might argue that the UK is well equipped to exploit new technologies, leading over time to the emergence of world-leading British companies, in manufacturing as well as in services. For that to happen, according to this view, an active industrial policy, with the government targeting the most promising industries for support, is essential. But Posen is right to insist that any UK industrial policy should be based on a realistic assessment of the country’s existing and potential future capabilities, not on wishful thinking. As a medium-sized industrial nation with a particular set of strengths and weaknesses, the UK should follow its own path.

Recent events in the semiconductor industry support this judgement.

67. Andy Haldane, The global industrial arms race is just what we need, *Financial Times*, June 26, 2023.

68. Rachel Reeves, A new business model for Britain, *Labour Together*, May 2023.

69. *Financial Times*, July 16, 2023

In 2021, when a worldwide shortage of semiconductors was causing serious problems for car makers and other large semiconductor users, the government commissioned a study of the industry from the Department of Digital, Culture, Media and Sport. (The study was later transferred to the new Department for Science, Innovation and Technology.) The remit was partly to examine how the supply chain for semiconductors could be made more resilient, but partly also to look at the longer-term future of the industry and what the government might do to support it.⁷⁰

When the report appeared, it was criticized on the grounds that the amount of government money committed to the sector was far too small, compared to what was available to semiconductor companies in the US and the EU.⁷¹ Yet it was clearly not feasible or desirable for the UK to invest in large-scale fabrication plants of the sort that exist in Taiwan and South Korea, similar to the ones that are now under construction or planned in the US and the EU. It made more sense to strengthen those parts of the industry where the UK had a relatively strong competitive position, as in semiconductor design and in compound (non-silicon) semiconductors. At the same time, with technical change in semiconductors continuing at a rapid pace, the government should continue to support semiconductor-related research on a broad front, some of which is likely to generate commercial opportunities.

The semiconductor story illustrates another point. The great British success in this sector is Arm Holdings, based in Cambridge. This company is not a manufacturer, but its central processor architecture is licensed to virtually all the world's leading mobile phone makers and many other electronics firms. The rise of Arm, which was spun out of Acorn Computers, a pioneering microcomputer maker, and established as an independent company in 1990, was a remarkable entrepreneurial achievement, not the result of industrial policy.⁷² It is only in the last few years that the company has come to be regarded as a national champion, with the government taking a close interest in its future.⁷³

The ability of governments to predict which industries - let alone which firms - will grow and prosper in their country is limited. They can and should take a view about which technologies are likely to be important, and this will be reflected in decisions about how funds for government-supported research are distributed. The funding agencies need to be empowered to take risks, as in the case of the UK's newest funder, the Advanced Research and Invention Agency (ARIA). ARIA is charged with supporting high-risk projects which, if successful, may have a transformative effect on the economy. But these will be calculated risks with a clearly defined objective, and the project will be terminated if not enough progress is being made.

In industrial policy, targeted measures are risky in a different sense. Too often they involve open-ended support from government, and they can acquire a degree of political backing which makes them difficult to abandon.⁷⁴ They may be justified in particular circumstances - to protect national security, to insure against supply disruptions in critical areas like

70. The background to this decision is described in Geoffrey Owen, *Semiconductors in the UK: searching for a strategy*, Policy Exchange, June 27, 2022.

71. *National semiconductor strategy*, Department for Science, Technology and Innovation, May 2023.

72. For a recent history of Arm see James Ashton, *The everything blueprint: the microchip design that changed the world*, Hodder & Stoughton 2023.

73. In 2016 Arm was acquired by the Japanese conglomerate, SoftBank, which believed that, by injecting new capital, it could help Arm expand its share of the semiconductor market. Four years later SoftBank's owner changed his mind and tried to sell Arm to an American semiconductor company, Nvidia. This deal was blocked by the UK competition authorities, and SoftBank decided to float Arm on the stock market as an independent company. Despite strong pressure from the UK government, SoftBank chose to list Arm shares in the US rather than London.

74. Chiara Criscuolo, Nicolas Gonne, Kohei Kitazawa and Guy Lalanne, *An industrial policy framework for OECD countries: old debates new perspectives*. OECD Science, Technology and Industry Papers No 127, May 2022.

health, and to promote decarbonisation – but they should be approached with caution.

In each case the rationale should be clear, and the project must be closely monitored. They should provide as much scope as possible for competition, from early-stage research through to commercialisation. If the intervention is justified because of the industry's strategic importance, the government needs to explain why one industry is more strategic than another – and why the project cannot be financed from commercial sources.

The main focus of industrial policy should be on horizontal measures which do not discriminate between industries, and these measures should be implemented in a consistent and predictable way, without the lurches in policy and institutional instability that have characterised UK industrial policy in the past.



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