UNIVERSITY OF CAMBRIDGE

Cambridge Industrial Innovation Policy

From innovation to industrial competitiveness

Institutional capability for translating UK science and technology into industrial capability

SUMMARY REPORT

Cambridge Industrial Innovation Policy, Institute for Manufacturing, University of Cambridge

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About this report

This summary report highlights the key findings from a study commissioned by the Department for Business, Innovation, Science and Trade (DBIST) to inform the work of the National Technology Adviser, Dr Dave Smith.

This report is based on the authors' interpretation and analysis of the evidence reviewed, including insights and data shared by the consulted stakeholders. These findings do not necessarily represent the view of DBIST and the National Technology Adviser; nor do they imply the expression of any opinion on their behalf.

Department for Business, Innovation, Science & Trade

REPORT COMMISSIONED BY DBIST,
OFFICE OF THE NATIONAL TECHNOLOGY ADVISER

Contributors

The contributors to this report are David Leal-Ayala, Mateus Labrunie, Francisco Veiga-Pereira, Zongshuai Fan, Carlos López-Gómez, and Eoin O'Sullivan.

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Foreword

I am grateful to colleagues at the Institute for Manufacturing for this thoughtful and important report. It builds on the Institute's earlier analysis of what makes the UK industrial innovation system distinctive. That showed the UK's research strengths do not automatically translate into production capability, industrial scale or value retained in the UK.

The first report discussed structural imbalances. Both in the value capture of our science – invented here but made elsewhere – and in the relative strength and state support of our sectors. Diagnosis pointed to much discussed factors: the right kind of capital, in the right amount, at the right time, skilled workers in the right place, available and accessible infrastructure and so on. But also to the unusual emphasis on research through Universities in the UK, as opposed to the range of large, networked research institutions more common in other countries.

This one identifies a more fundamental weakness: alignment on how an opportunity can be scaled competitively in the UK, whether the domestic supply chain is ready, and if strategically important capabilities are being retained. It is significant that institutional accountability weakens as technologies approach industrial scale.

The current focus on commercialisation alone is inadequate and, today, misses the link to value capture. Strong sectors contain within them institutional champions with the mandate and culture for translation that develops resilient supply chains and supports industrial scale.

This report draws lessons from industrialised economies like Germany, Taiwan, Netherlands, Singapore and the US, from business leaders and analysis of institutions that support translation in the UK.

We know that scientific leadership does not automatically translate into industrial strength. We will need to adapt the UK R&D system to support reindustrialisation in the UK, at risk of continuing excellence in some sectors but an underlying translation weakness that is a result of our systems

I believe the call to action is pragmatic. It does not require a raft of new institutions at great expense to the taxpayer. The UK does not lack excellent organisations, firms or people. Too often, however, their capabilities are not organised around shared industrial outcomes.

Industrial competitiveness requires production capability, suppliers, skills, finance, infrastructure, industrial users and demand to develop together.

We should begin by making accountability explicit, connecting existing institutions and judging success by the global leadership of industrial capabilities created and value retained.

Dr Dave Smith, National Technology Adviser

Executive summary

Key messages

- **Previous analysis points to a structural imbalance in the UK's industrial innovation system.** The system is exceptionally strong in universities, science, and early-stage research but has a narrower institutional base for applied research, industrialisation, and production.
- **The conventional model of "translation" captures an important part of the challenge, but not the whole picture.** Commercialising research or supporting individual firms are valuable elements of a broader approach. Industrial competitiveness also depends on production capability, suppliers, skills, finance, infrastructure, industrial users, and demand developing together in a coordinated way.
- **The analysis suggests that system-level value capture – not only commercialisation – may provide a broader measure of the UK's innovation system.** A key consideration is the extent to which technological opportunities translate into domestic production, competitive industries, and lasting economic value in the UK.
- **Formal institutional responsibility appears to become less clearly assigned as technologies approach industrial scale.** Almost two-thirds of technology development activity identified has a defined institutional owner, compared with less than one-third of industrial development activity.
- **The most notable gaps relate to manufacturability, domestic supply chains, and capability retention.** There appears to be less clarity about who should assess whether an opportunity can be produced competitively in the UK, and who should act on that judgement.
- **Translation institutions and industrial firms can be viewed as complementary parts of the same system.** Research and technology organisations (RTOs) and Catapults offer shared technical capabilities; and primes provide production knowledge, supplier pull, systems integration, and routes to market.
- **The findings suggest there may be greater scope to repurpose and connect existing institutions than to create new ones.** Experience in other advanced economies indicate that commissioning, governance, aligned funding, procurement, and industrial participation can help distributed institutions work towards shared outcomes.
- **Clearer sector-level accountability for industrial value capture may help address the gaps identified.** Although institutional arrangements are likely to vary by sector, the findings suggest each strategically important sector would benefit from an accountable body or partnership able to identify capability gaps and mobilise a response.

Previous analysis points to a structural imbalance towards science and early-stage innovation

The UK combines internationally strong science with a more mixed record in converting it into production capability and value retained in the domestic economy. This is not just a collection of unrelated sectoral problems. Previous analysis identified a wider structural feature of the UK system: an unusually strong concentration of institutions, funding and incentives around universities and early-stage research, and a narrower institutional base for applied research, industrialisation, and production. Conventional accounts describe the challenge as a linear translation problem: research produces knowledge, an intermediary helps to commercialise it, and firms take it to market. But that framing is incomplete.

Industrial outcomes may depend on a range of complementary capabilities that often need to develop in parallel. Technologies may need to become manufacturable at competitive cost and quality, while firms can benefit from access to specialised suppliers, skills, finance, and infrastructure. Products need standards, regulatory approval, customers, and routes to market. A technology may therefore be technically mature while the surrounding industrial system remains unready. Start-ups, patents, venture investment, and successful exits can indicate valuable innovation activity, but may not fully capture whether production, supply chains, and industrial value are accumulating in the UK.

The analysis points to system-level value capture, not commercialisation alone, as the more relevant test

This study uses system-level value capture as its organising lens: aligning technological opportunities with the capabilities required to manufacture, scale, and retain the resulting value in the UK. This implies a focus on outcomes rather than innovation outputs alone. The relevant test is not simply whether research was funded, intellectual property created, demonstrators completed, or start-ups formed. It is whether interventions create or retain the production, supplier, workforce, infrastructure, and other capabilities required for industrial competitiveness.

Sectoral differences matter, but the findings suggest they do not remove the case for a common national approach. Different sectors may require different institutional arrangements; all require a clear route from technological opportunity to industrial capability and retained value.

Translation institutions can provide system-level capabilities that individual firms cannot

RTOs, Catapults, and related bodies can usefully be understood not just as bridges between science and individual firms but as instruments of system-level value capture. Their distinctive public purpose is to provide shared capabilities, including facilities, standards, pilot production capacity, supplier coordination, workforce development, and infrastructure. Individual firms may lack the incentive or ability to develop these capabilities alone, yet they can be essential to developing an entire value chain.

The international cases suggest that other advanced economies organise institutions and resources around these system-level needs, sometimes at a different scale of ambition: one firm returning from a visit to a counterpart operation overseas described its research facility as **"a full production plant – not a little lab-scale plant"**. The relevant comparison is therefore how effectively they connect technological opportunities with the wider capabilities required for industrial scale.

The UK supports industrial development, but responsibility becomes weaker towards scale

The UK does not lack activity beyond research. Among the cross-sector organisations assessed, the study identified 169 instances of technology development activity and 145 instances of industrial development activity. The difference is how firmly these activities are embedded in institutional mandates. Almost two-thirds of technology development activity forms part of an organisation's defined responsibility, compared with less than one-third of industrial development activity. Nine of the ten functions with the lowest shares of defined responsibility concern industrial development.

The system does not stop when technologies leave the laboratory. Rather, responsibility becomes progressively less clear for assembling the capabilities needed to achieve production, scale, and retained value. This finding is consistent with the original diagnosis: the UK's institutional system is configured more clearly for creating and commercialising knowledge than for converting it into industrial capability.

The largest gaps in formal responsibility arise at the point of industrialisation

The mapping identified three important weaknesses:

- **Manufacturability:** no defined holder was identified for judging whether an emerging technology could realistically be manufactured in the UK, what capabilities would be required, and how critical gaps should be closed.
- **Domestic supply chains:** supplier development activity exists, but no defined holder was identified for assessing whether the domestic supply chain can support industrial scale and for coordinating a response where important capabilities are missing.
- **Capability retention:** investment attraction is relatively well institutionalised, but responsibility is less clear for retaining strategically important production and supply chain capability.

These are not just gaps in programme provision. They may indicate gaps in system-level judgement and accountability, particularly around who assembles the evidence, identifies the capabilities needed, mobilises the relevant institutions, and responds when strategically important capabilities appear to be missing or at risk.

Industry consultations pointed in the same direction. One firm, listing the organisations it passed through from early funding to market, noted that government treats these as separate remits while a company experiences a single pathway, and asked simply **"Who owns that journey?"**

Translation institutions and primes play complementary roles in one system

Research and innovation institutions provide shared facilities, technical capabilities, validation, and specialist expertise but they cannot reproduce all the functions performed by established industrial firms, original equipment manufacturers (OEMs), and other major users. Primes can integrate complex technologies, invest in production, qualify suppliers, and provide demanding first customers. Their engineering knowledge, procurement requirements, supplier relationships, and routes to deployment help to determine whether emerging technologies develop into industrial capabilities.

This points to a policy environment in which:

- translation institutions reduce shared technical and industrial risks
- primes and other major users articulate production requirements, integrate technologies, develop suppliers, and create lead demand
- government aligns finance, skills, infrastructure, regulation, and procurement, and
- smaller firms, suppliers, and researchers contribute within a credible route to industrial scale.

The question is not whether translation institutions or primes should lead in isolation but how their complementary capabilities can be connected through governance, programmes, funding, and shared objectives.

Existing UK institutions could be connected as sector-level industrial translation networks

The UK already has many of the organisations needed for industrial translation: universities, Catapults, sector bodies, finance institutions, standards organisations, skills bodies, investment agencies, regional institutions, and firms. The mapping suggests that these capabilities are distributed across separate organisations, and formal mandates do not consistently organise them around shared sector outcomes. Technical capability may sit in a Catapult, finance in a cross-sector body, supplier development in an industry organisation, workforce responsibilities in the skills system, and investment attraction in central government.

The principal opportunity may therefore lie less in creating an entirely new institution for every sector and more in adapting and connecting existing organisations as sector-level industrial translation networks with:

- a common view of the opportunity and the value the UK seeks to capture
- clearly allocated responsibilities
- durable relationships between translation institutions and industrial users
- aligned programmes, funding, and performance measures, and
- an accountable mechanism for identifying gaps and mobilising action.

The international cases illustrate how distributed institutions can be made to operate as a system

The international cases differ in structure but demonstrate common design principles:

- **Taiwan** connects government technology direction to the Industrial Technology Research Institute (ITRI) and other research organisations through explicit commissioning relationships.
- **Germany** locates programme management capability close to technical expertise and uses industry associations to articulate collective industrial needs.
- **Singapore** connects research, enterprise support, investment, skills, and industrial land through closely related public agencies and active anchor firms.
- The **United States** uses mission agencies such as NASA to combine technical direction, investment, and procurement.
- **China's** battery sector directly involves manufacturers in an industrialisation platform.

The lesson is not that the UK should copy one institutional model. Rather, it is that the systems examined use commissioning, governance, aligned funding, procurement, and industrial participation to connect strategic direction with the organisations that control capabilities and resources.

Institutional diversity does not mean leaving coordination to chance

The findings suggest that each strategically important sector would benefit from clear accountability for industrial value capture, guided by the Industrial Strategy priorities and objectives. One possible approach would be for government to consider designating an existing body, partnership, or leadership arrangement in each strategically important sector to help convene efforts around industrial value capture. This does not necessarily involve creating a new organisation. The role could be performed by a strengthened sector team within a relevant department, a government–industry partnership, or another recognised leadership body.

What matters is that it has the authority and capability to establish:

- which technological and industrial opportunities the UK should pursue
- what value the UK should seek to capture
- which production, supplier, skills, infrastructure, finance, and market capabilities are required
- which organisations and firms are responsible for delivering them, and
- how gaps or risks will be escalated and addressed.

Sectoral arrangements can differ, but the gaps identified arise where these responsibilities are left implicit. Four questions can translate sector ambition into clear accountability. For each strategically important sector, they offer a practical test: can government and industry answer the following questions?

1. What opportunities should the UK pursue, and what value should it seek to capture?
2. Can the required production capability realistically be developed in the UK?
3. Who is responsible for developing the supplier base and other shared capabilities?
4. Who is responsible for attracting, expanding, and retaining strategically important capability?

These questions reveal whether responsibility is genuinely assigned or depends on informal contributions; they provide a common accountability framework while allowing delivery arrangements to reflect sector circumstances.

Implications: five areas where action could strengthen the UK's capacity to capture industrial value

1. **A clearer convening function for each Industrial Strategy sector.** Government could consider identifying an existing sector team, body, or partnership to take a convening role in defining the opportunity, the value the UK seeks to capture, and the capabilities this would require. This function could sit within DBIST, working through shared objectives and stronger collaboration with relevant sector teams, Innovate UK, and UK Research and Innovation (UKRI). Where no suitable arrangement exists, the evidence favours repurposing or strengthening an existing institution before a new one is considered. The arrangement would align with the Industrial Strategy, define what success means for the sector, and monitor the UK's position internationally.
2. **A living opportunity–capability roadmap for each sector.** Such a roadmap could assess the extent to which the capabilities needed for industrial scale exist in the UK, identify emerging gaps, and highlight strategic assets that may be at risk. It could support a more explicit assessment on manufacturability, supply chain readiness, and the economics of domestic production; track how technological disruption and changes in the international competitive landscape are reshaping the sector; and help identify the capabilities and skills the UK will need to remain competitive.

3. **Stronger sector-level industrial translation networks, building on existing institutions.** RTOs, Catapults, universities, industry associations, primes, suppliers, finance bodies, and delivery agencies could be connected around shared outcomes. The international cases suggest that commissioning, joint governance, user participation, aligned programmes, and multi-year funding can turn institutional relationships into reliable delivery mechanisms.
4. **Clearer links between major public interventions and industrial outcomes.** There may be value in specifying more explicitly the UK capabilities and value that each intervention is expected to create or retain would make these links explicit. These may include production, continuing R&D, supplier capability, workforce skills, infrastructure, or lead demand. Performance measures could then track these outcomes, not just research or programme outputs.
5. **Tracking firms and technologies through industrialisation to identify capability gaps and recurring barriers.** Following technologies from research through to demonstration, production, and scale could help distinguish gaps in institutional responsibility from weak connections, insufficient resources, or wider framework constraints. Recurring barriers could then inform changes to mandates, programmes, and funding.

What success could look like: correcting the structural imbalance between scientific strength and industrial capability

The report does not recommend one institutional architecture or a new organisation for every sector. But it does identify a common national problem: the UK's institutional system is more clearly configured to create and commercialise knowledge than to build and retain the capabilities required for industrial scale. Sectoral variation bears on how a response might be delivered rather than on whether one is warranted.

Success would mean that every strategically important sector can:

- identify opportunities with a credible prospect of UK value capture
- translate ambition into requirements for production, suppliers, skills, finance, infrastructure, and demand
- combine shared institutional capabilities with firms' production knowledge and routes to market
- mobilise distributed organisations through durable and accountable relationships
- judge performance through industrial outcomes and capability accumulation, and
- foster a vibrant system in which UK firms can access the infrastructure needed to innovate and compete internationally.

The UK's scientific strength is a major national asset, but it does not automatically produce industrial competitiveness. The opportunity lies in repurposing and connecting the UK's existing capabilities – turning science and technology into production, competitive industries, and lasting value in the UK.

About this study

This study was commissioned by DBIST to inform the work of the National Technology Adviser. It assessed 33 cross-sector institutions and 28 organisations with sector-specific mandates in aerospace, automotive, and life sciences. The analysis covered 18 technology and industrial development functions and examined where institutions act across technology, manufacturing, supply chain, and business and market development. Stakeholder consultations tested the interpretation, while seven international comparator cases identified alternative institutional mechanisms. The study maps published mandates and operating instruments rather than institutional effectiveness. A blank means no relevant published instrument was identified, not that no activity occurs.

Introduction

The UK's institutional landscape for innovation is extensive and, in important respects, effective. Universities and research councils sustain a research base of acknowledged international standing; Innovate UK, the Catapult Network, and the public sector research establishments provide routes from public knowledge to industrial use; and the measurement, standards, and intellectual property institutions supply the infrastructure of trust on which market entry depends. Assessed against the functions conventionally associated with an innovation system, the UK has an organisation with a mandate for each.

At the same time, this extensive institutional landscape coexists with more mixed outcomes in translating UK innovation into industrial capability and value capture. Previous Cambridge Industrial Innovation Policy (CIIP) work[1] identified a distinctive UK configuration: internationally strong science and early-stage innovation alongside a narrower public applied R&D institutional base, concentration of innovation activity in a small number of sectors, and high mobility of firms and industrial R&D. Taken together, these features describe a structural imbalance rather than a set of unrelated sectoral problems: institutions, funding, and incentives are concentrated around universities and early-stage research, while the institutional base for applied research, industrialisation, and production is comparatively narrow.

The same report also highlighted the importance of mature value chains, anchor firms, and production knowledge in sectors where the UK has been better able to translate technological strengths into sustained industrial capability. Related work on technology scale-up has shown why this transition can become difficult: innovators and early-stage firms may succeed in proving a technology while still lacking the manufacturing capability, specialised suppliers, scale-up finance, skills, infrastructure, and customers needed to industrialise it in the UK.

This concern has a long history in UK policy reviews, although the diagnosis has broadened over time. Hauser's 2010 review of Technology and Innovation Centres in the UK focused on a missing intermediate layer between academic research and commercial application, arguing for business-facing organisations that are able to mature technologies, develop demonstrators and manufacturing processes, and provide specialist facilities that individual firms could not justify on their own.[2] Subsequent Catapult reviews largely retained that rationale but drew attention to scale, business engagement, collaboration, accessibility, and long-term funding.[3]

Nurse's 2023 review of the RDI organisational landscape widened the lens, highlighting the complexity of the wider research and innovation landscape, fragmented responsibilities, and the need for clearer coordination and accountability across organisations.[4] More recent reviews of scale-up have added constraints around growth, finance, procurement, industrial infrastructure, skills, and access to markets.[5] The resulting policy debate has therefore moved beyond a simple "valley of death" between research and commercialisation towards a wider question of whether the capabilities needed for industrial scale-up are sufficiently available, connected, and sustained.

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[1] Cambridge Industrial Innovation Policy (2025). *What makes the UK industrial innovation system different?*
[2] Hauser, H. (2010). *The Current and Future Role of Technology and Innovation Centres in the UK.*
[3] Hauser, H. (2014). *Review of the Catapult network: recommendations on the future shape, scope and ambition of the programme*. London: Department for Business, Innovation and Skills; Ernst & Young LLP (2017). *Catapult Network Review*. London: Department for Business, Energy and Industrial Strategy; Department for Business, Energy and Industrial Strategy (2021). *Catapult Network Review: how the UK's Catapults can strengthen research and development capacity*. London: Department for Business, Energy and Industrial Strategy.
[4] Nurse, P. (2023). *Independent Review of the UK's Research, Development and Innovation Organisational Landscape*.
[5] House of Lords Science and Technology Committee (2025). *Bleeding to death: the science and technology growth emergency*. HL Paper 192, Session 2024–26. London: House of Lords; ScaleUp Institute (2025). *ScaleUp Annual Review 2025: powering up the scaleup economy*. London: ScaleUp Institute.

This report contributes to that body of evidence by approaching the problem from a different direction. Rather than seeking to identify another barrier to scale-up or asking whether the UK needs another type of institution, it examines what existing institutions are formally expected to do as technologies move from research towards production and industrial scale, and the coherence in their mandates and responsibilities.

The analysis maps institutional activity against 18 technology and industrial development functions, distinguishes between activity that is part of an organisation's defined mandate and responsibility and activity undertaken on a more contributory basis, and examines where institutions act along technology, manufacturing, supply chain, and business and market development journeys. This allows the study to ask whether the institutional system has evolved alongside the widening policy ambition from technology development towards industrial capability, and whether functions that are already being performed have sufficiently clear institutional responsibility. The analysis therefore asks not only where individual functions sit but what their distribution implies for the organisation of research-to-industry translation across institutions and industrial actors. The study is organised around three analytical questions:

- The first question asks whether the institutional setup of the UK national innovation system is configured more clearly for technology development than for sectoral industrial development – in particular, whether institutional responsibility and mandates are less clearly assigned as technologies move towards production and industrial scale.
- The second asks how clearly responsibility is allocated for anchoring industrial capability in the UK, including the development of supply chains, the attraction and retention of investment, and the domestic production base.
- And the third asks what can be learned from UK sectors where sector-level strategic direction and industrial development responsibilities are more explicitly organised, recognising that these arrangements can take different institutional forms rather than following a single model.

These questions provide a structure for the analysis rather than propositions that the study was expected to confirm. The focus on institutional responsibility does not imply that government should perform these functions directly. Rather, some innovation and industrial development needs involve shared capabilities or complementary investments that require coordination across firms, suppliers, research organisations, and public bodies, raising the question of whether the institutional system provides a clear mechanism for organising that collective response.[6]

The study drew on 3 sources of evidence: an institutional assessment of published mandates and operating instruments (Section 2.3); 13 consultations with industry, government, institutional, and sector stakeholders, used to test and interpret the emerging findings; and 7 international comparator cases examining alternative ways of organising research-to-industry translation.

The report begins by establishing the conceptual relationship between scientific and technological strength, the industrial capabilities needed to develop and scale innovation, and the extent to which the resulting economic value is retained in the UK. Section 1 therefore moves beyond research and commercialisation to consider manufacturing capability, supply chains, skills, finance, infrastructure, market access, and the complementary assets that shape where industrial activity takes place.

Section 2 applies this perspective to the UK institutional landscape, mapping where organisations act across the innovation-to-industry journey and examining how clearly responsibility is assigned for both technology development and industrial development functions. It combines a cross-sector assessment with sector studies in UK aerospace, automotive, and life sciences to identify where responsibilities are

[6] OECD (2022). An industrial policy framework for OECD countries. *OECD Science, Technology and Industry Policy Papers*, No. 127.

well defined, where they are shared or contributory, and where no clear institutional holder could be identified in the published evidence.

Section 3 uses the same functional framework to examine international comparator cases, not to identify a single model for the UK to copy but to show the different ways in which sector direction, technical capability, and wider industrial development functions can be organised and connected. Finally, Section 4 brings the UK and international findings together, translates them into a small number of accountability questions for strategically important sectors, and sets out practical options for clarifying responsibilities, strengthening relationships between institutions, and addressing specific gaps.

The report's central message builds on, rather than displaces, the earlier diagnosis of the UK innovation system. Previous CIIP work identified a distinctive UK configuration: internationally strong universities and early-stage innovation alongside a narrower applied research and industrial development institutional base. This study shows that the institutional landscape has broadened well beyond research and technology development, with substantial industrial development activity taking place across existing organisations. What has not evolved to the same extent is the way those capabilities are organised around industrial outcomes: responsibility becomes less clearly assigned towards production and scale, while sector direction is not consistently connected to the institutions, industrial firms, and other actors that hold the capabilities required for delivery.

The practical opportunity is therefore not simply to add another type of institution but to repurpose and connect existing institutions more deliberately around sector-level industrial objectives. A more strategic approach would establish, sector by sector, the industrial capabilities and value the UK wants to develop and retain; identify the production, supplier, workforce, infrastructure, finance, and market requirements associated with that ambition; and organise the relevant institutions and industrial actors as a translation network around those requirements. The international evidence shows that these networks can take different institutional forms, but direction, technical capability, and delivery can be connected through explicit commissioning, governance, funding, or other durable relationships.

1) From science and innovation to retained industrial value

Scientific and technological strength creates opportunities for economic value, but it does not determine where that value will be realised. Capturing value in the UK also depends on the industrial capabilities needed to develop, manufacture, scale, and deploy innovation - including production know-how, suppliers, skills, finance, infrastructure, and access to markets.

These capabilities are often complementary and mutually reinforcing. Where they are present and well connected, innovation can support jobs, domestic value added, resilient supply chains, and future technological capability. Where they are missing or fragmented, a larger share of the resulting activity may be realised elsewhere. The relevant policy objective is therefore broader than research excellence or technology commercialisation alone: it is to create and retain the capabilities through which innovation can contribute to sustained industrial competitiveness and national value.

The UK combines sustained scientific strength with a declining position on several measures of industrial activity. It remains one of the world's strongest nations for quality and volume of scientific research, while manufacturing's share of gross value added fell from around 16% in 1990 to under 10% by 2022, and the UK's share of global activity across advanced industries roughly halved between 2000 and 2020.[7] These indicators do not establish a causal relationship between research performance and industrial outcomes. They frame the question examined in this report: what determines whether scientific and technological strengths are translated into industrial capability and value retained in the UK?

FIGURE 1. THREE INDICATORS FRAME THE INDUSTRIAL TRANSLATION CHALLENGE

+40%	8.7% → 6.4%	3.1% → 1.9%
Scientific publications per thousand people	**High-technology exports as a share of total exports**	**UK share of global manufacturing value added**
2007–2022	2007–2022	2000–2022

SOURCE: CAMBRIDGE INDUSTRIAL INNOVATION POLICY (2026). *UK INNOVATION REPORT 2026*; CIIP MANUFACTURING DASHBOARD, DRAWING ON WORLD BANK DATA. INDICATORS COVER DIFFERENT PERIODS AND ARE NOT PRESENTED AS A CAUSAL SEQUENCE.

1.1 Value can be realised in the UK or elsewhere along the translation journey

This wider view becomes important once innovation moves beyond the research base and begins to depend on production capability, suppliers, finance, regulation, and customers. Knowledge generated in the research base must pass through applied development, demonstration, and scale-up before it can be realised in production and the market. Strong science remains essential, but it is only one part of this journey. The availability of manufacturing capability, suppliers, skills, infrastructure, finance, and routes to market also affects where the resulting activity takes place and how much is retained domestically.

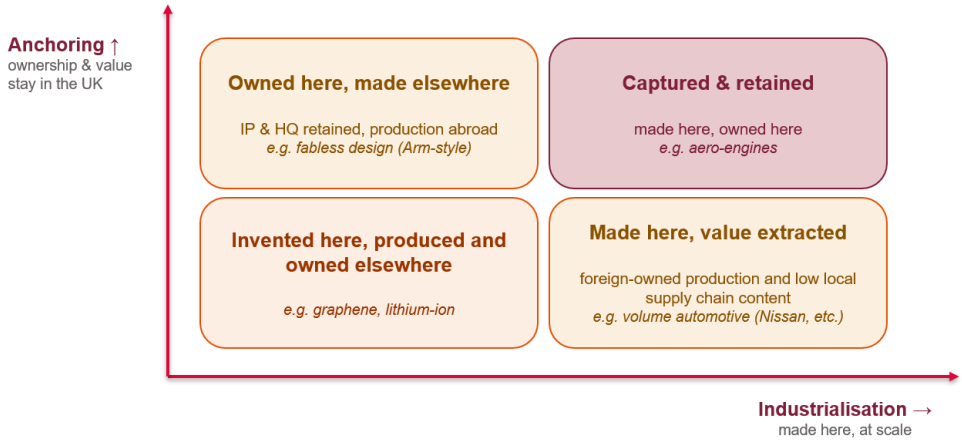
Nor is the journey a simple sequence from laboratory to market. Technical performance, manufacturability, supply chain readiness, regulatory compliance, and customer adoption often have to advance together. Progress in one area may reveal a constraint in another: a technology can work in the laboratory but remain too costly to manufacture; a prototype can perform well but rely on components

[7] Cambridge Industrial Innovation Policy (2025). *UK value capture from innovation: understanding the alignment challenges between UK R&I capabilities and industrial opportunities*. Cambridge: Institute for Manufacturing, University of Cambridge; Atkinson, R. D. and Tufts, I. (2023). *The Hamilton Index, 2023: China is running away with strategic industries*. Washington, DC: Information Technology and Innovation Foundation. Measured as a narrow sector, UK manufacturing is around 9% of value added; measured as a value chain including the design, engineering, and knowledge-intensive services bound up with it, it is closer to 15%.

that no domestic supplier makes; and a product can be technically ready while still lacking regulatory approval, production finance, or a credible route to customers.

Figure 2 illustrates the range of potential outcomes. Measures such as spinouts formed, valuations reached, or readiness levels attained describe important parts of the innovation process, but they say much less about where production, employment, supplier activity, or strategic capability accumulate. A fuller assessment of innovation performance therefore needs to consider industrialisation and the location of value alongside conventional activity indicators.

FIGURE 2. THE VALUE TRANSLATION SPINE AND ITS FOUR OUTCOMES; RESEARCH AND INNOVATION CREATE ECONOMIC ACTIVITY THAT MAY BE DISTRIBUTED BETWEEN THE UK AND OTHER LOCATIONS IN DIFFERENT WAYS



SOURCE: CIIP ANALYSIS.

1.2 National value is broader than headline gross value added

Industrial activity contributes to national value in several ways, and headline gross value added captures only part of that contribution. The wider effect also depends on how strongly production is connected to domestic suppliers, skills, and related economic activity.

For this study, national value is considered in five forms: security of supply; jobs, domestic value added, and trade; the adoption and diffusion of innovation; sector and place competitiveness; and the commercialisation and scale-up of research and development.[8] The last of these is most directly associated with the "invented here, produced elsewhere" problem, but the others matter in their own right. Domestic sourcing is one part of the picture. Around 70% of manufacturing exports in the UK are created domestically, against 88% in services, so raising domestic content increases the value added captured at home.[9]

Connectedness matters because production also generates activity through suppliers and related services. UK manufacturing value chains accounted for around 15% of value added in 2019, compared with 33% in Germany and 29% in Switzerland, and the UK share had fallen further and faster than those comparators since 1999.[10] A production base that draws less heavily on domestic suppliers generally generates smaller domestic multiplier effects. For this reason, the framework treats connectedness as

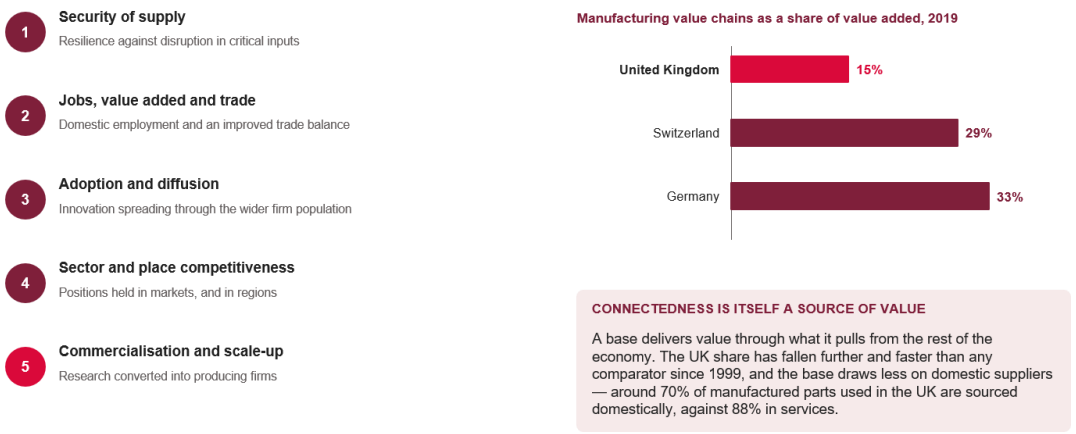
[8] López-Gómez, C., Palladino, M. and Leal-Ayala, D. (2023). *Why manufacturing supply chains matter and how to revitalise them: the role of supply chains in achieving socio-economic missions*. Report for the Department for Business and Trade. Cambridge Industrial Innovation Policy / IfM Engage, University of Cambridge.
[9] López-Gómez, C., Palladino, M. and Leal-Ayala, D. (2023). *Why manufacturing supply chains matter and how to revitalise them: the role of supply chains in achieving socio-economic missions*. Report for the Department for Business and Trade. Cambridge: Cambridge Industrial Innovation Policy / IfM Engage, University of Cambridge.
[10] Castañeda-Navarrete, J. (2026). *Measuring what matters: the real value of manufacturing in the UK economy*. CIIP Insight, 29 April, drawing on Cambridge Industrial Innovation Policy / IfM Engage (2026). *The changing value and structure of the UK manufacturing sector*. Report for the Department for Business and Trade.

not just a feature of the industrial system but one of the channels through which industrial activity contributes to national value.

This also raises a question of public value. Where innovation has been supported with public funding, policymakers may reasonably ask how far the resulting activity contributes to domestic capability, resilience, and wider economic benefit. The answer will vary by technology and sector, and it does not imply that all publicly supported innovation should be commercialised or manufactured domestically.

FIGURE 3. THE FIVE FORMS OF NATIONAL VALUE AND THE CONNECTEDNESS OF THE INDUSTRIAL BASE

Five forms of value — and the connectedness of the manufacturing base that delivers them



SOURCE: LÓPEZ-GÓMEZ, C., PALLADINO, M. AND LEAL-AYALA, D. (2023) *WHY MANUFACTURING SUPPLY CHAINS MATTER AND HOW TO REVITALISE THEM: THE ROLE OF SUPPLY CHAINS IN ACHIEVING SOCIO-ECONOMIC MISSIONS*. REPORT FOR THE DEPARTMENT FOR BUSINESS AND TRADE. CAMBRIDGE INDUSTRIAL INNOVATION POLICY / IFM ENGAGE, UNIVERSITY OF CAMBRIDGE; CASTAÑEDA-NAVARRETE, J. (2026) *MEASURING WHAT MATTERS: THE REAL VALUE OF MANUFACTURING IN THE UK ECONOMY*. CIIP INSIGHT, 29 APRIL. CAMBRIDGE INDUSTRIAL INNOVATION POLICY. DRAWING ON CAMBRIDGE INDUSTRIAL INNOVATION POLICY / IFM ENGAGE (2026). *THE CHANGING VALUE AND STRUCTURE OF THE UK MANUFACTURING SECTOR*. REPORT FOR THE DEPARTMENT FOR BUSINESS AND TRADE.

1.3 Two important conditions shape whether created value is retained

A further question is what allows some economies to retain more of the value generated by innovation than others. The literature points to the importance of complementary assets: the production capability, specialised suppliers, finance, distribution, skills, and routes to market needed to turn an invention into a product or service at scale. This helps to explain how strong research performance can coexist with thinner downstream industrial capability.

In practice, two closely related features matter throughout the value creation journey: the capabilities available to the value chain; and the way those capabilities connect to one another. The relevant capability base is broader than research and technology, including workforce and skills, production and manufacturing, supply chain capability, the industrial commons, firms' absorptive capacity, and demand-side capabilities such as lead markets and procurement. The mix will differ by sector, but in capital-intensive industries many of these capabilities need to develop together. Strong research capability alongside thinner production or supply chain capability can therefore leave more of the later industrialisation process dependent on assets located elsewhere.

Having the capabilities somewhere in the system is not enough if firms cannot combine them when they are needed. Connections between researchers, suppliers, investors, customers, and production organisations shape how quickly knowledge moves and whether emerging firms can progress from one

stage to the next. Absorptive capacity is central: firms need the ability to recognise, assimilate, and use knowledge developed elsewhere.[11]

The complementary assets literature provides a useful way of understanding this relationship. Teece showed that the returns from innovation do not necessarily accrue to the original inventor. Where an innovation is difficult to protect, organisations that control specialised manufacturing, distribution, finance, or market access assets may have greater bargaining power and capture a larger share of the economic return.[12]

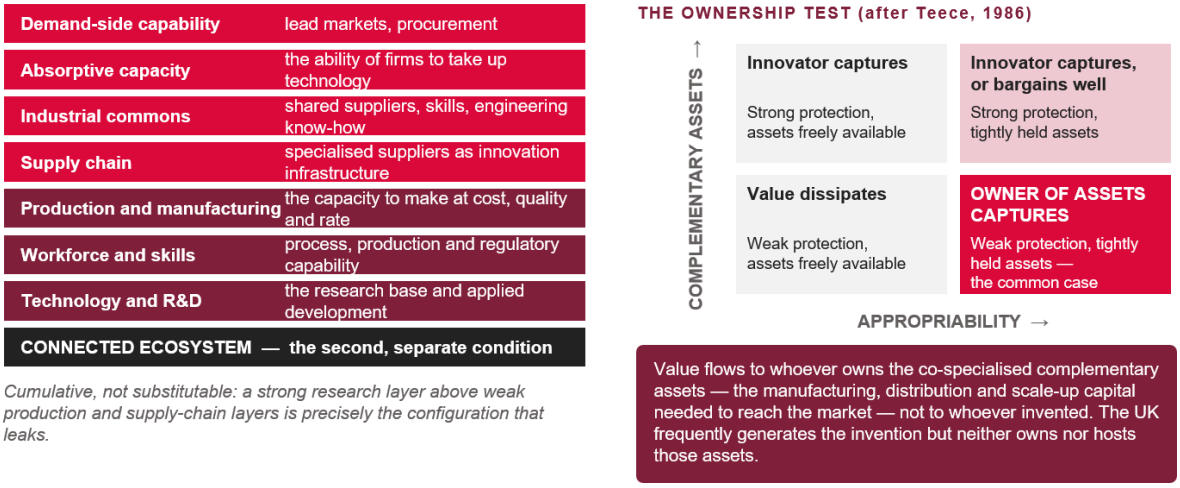
This argument is particularly relevant in an open economy. The assets needed to industrialise a UK-originated technology may be located or controlled elsewhere, just as foreign-owned firms may bring valuable production and market capabilities into the UK. The policy question is therefore not simply whether a capability appears on a national institutional map but where it is located, who controls it, and how accessible it is to firms seeking to scale. This is consistent with the wider innovation systems literature, which treats firms, knowledge, capital, and policy instruments as operating across national and regional boundaries rather than inside a closed national container.[13]

The same point can be seen at the level of the supply chain. Suppliers are not just logistical links: they can provide design input, research services, specialised engineering, and new technology throughout the product life cycle.[14] The idea of the industrial commons extends this, describing the shared pool of suppliers, skills, facilities, and know-how on which several firms or industries may depend. When that pool becomes thinner, adjacent industries can also find it harder to innovate and scale.[15]

These characteristics also provide a rationale for looking beyond conventional R&D market failures. Industrialisation can depend on shared facilities, specialised skills, supplier capabilities, or complementary investments whose benefits are spread across several firms, creating coordination problems that individual actors may not resolve on their own. The role of government or an intermediate institution is not necessarily to deliver the commercial activity itself but to ensure that shared capabilities are available and complementary actors and investments can be brought together where collective action is justified.[16]

[11] Cohen, W. M. and Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1): 128–152.
[12] Teece, D. J. (1986). Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. *Research Policy*, 15(6): 285–305.
[13] Flanagan, K., Uyarra, E. and Laranja, M. (2011). Reconceptualising the "policy mix" for innovation. *Research Policy*, 40(5): 702–713.
[14] López-Gómez, C., Palladino, M. and Leal-Ayala, D. (2023). Why manufacturing supply chains matter and how to revitalise them: the role of supply chains in achieving socio-economic missions. Report for the Department for Business and Trade. Cambridge: Cambridge Industrial Innovation Policy / IfM Engage, University of Cambridge.
[15] Pisano, G. P. and Shih, W. C. (2012). Producing prosperity: why America needs a manufacturing renaissance. Boston, MA: Harvard Business Review Press; Pisano, G. P. and Shih, W. C. (2009). Restoring American competitiveness. *Harvard Business Review*, 87(7–8): 114–125.
[16] OECD (2022). An industrial policy framework for OECD countries. *OECD Science, Technology and Industry Policy Papers*, No. 127.

FIGURE 4. THE CONDITIONS FOR VALUE CAPTURE. A STACK OF CAPABILITIES RESTING ON A CONNECTED ECOSYSTEM, AND THE COMPLEMENTARY ASSETS TEST: UNDER WEAK APPROPRIABILITY, THE OWNER OF SPECIALISED COMPLEMENTARY ASSETS CAPTURES THE VALUE



SOURCE: DERIVED FROM TEECE, D.J. (1986). PROFITING FROM TECHNOLOGICAL INNOVATION: IMPLICATIONS FOR INTEGRATION, COLLABORATION, LICENSING AND PUBLIC POLICY. *RESEARCH POLICY*, 15(6): 285–305; PISANO, G. P. AND SHIH, W. C. (2009). RESTORING AMERICAN COMPETITIVENESS. *HARVARD BUSINESS REVIEW*, 87(7–8): 114–125; PISANO, G. P. AND SHIH, W. C. (2012). *PRODUCING PROSPERITY: WHY AMERICA NEEDS A MANUFACTURING RENAISSANCE*. BOSTON, MA: HARVARD BUSINESS REVIEW PRESS; COHEN, W. M. AND LEVINTHAL, D. A. (1990). ABSORPTIVE CAPACITY: A NEW PERSPECTIVE ON LEARNING AND INNOVATION. *ADMINISTRATIVE SCIENCE QUARTERLY*, 35(1): 128–152; LÓPEZ-GÓMEZ, C., PALLADINO, M. AND LEAL-AYALA, D. (2023). *WHY MANUFACTURING SUPPLY CHAINS MATTER AND HOW TO REVITALISE THEM: THE ROLE OF SUPPLY CHAINS IN ACHIEVING SOCIO-ECONOMIC MISSIONS*. REPORT FOR THE DEPARTMENT FOR BUSINESS AND TRADE. CAMBRIDGE INDUSTRIAL INNOVATION POLICY / IFM ENGAGE, UNIVERSITY OF CAMBRIDGE.

1.4 How value can move elsewhere, and what that implies for policy

Several familiar pathways can result in a smaller share of UK-originated value being realised domestically. None should automatically be treated as a policy failure. The concern arises when repeated losses of production, strategic activity, or supplier capability begin to weaken the domestic conditions available to the next generation of firms.

The cases reviewed in the conceptual framework illustrate different versions of this process: changes in ownership and strategic control, overseas listing and scaling, relocation of production, licensing of intellectual property for industrialisation elsewhere, and the gradual erosion of domestic supply chains. Arm, DeepMind, Dyson, lithium-ion technology, and graphene are used as illustrations of these pathways, not as evidence that all of the value associated with these technologies moved abroad.[17]

These transactions should be interpreted carefully. Acquisition, overseas scaling, offshoring, or licensing may reflect commercial choices as well as market and system conditions, but they can be made more likely or consequential where firms face weak appropriability, limited access to shared capability, coordination problems, or low absorptive capacity. A policy response focused on an individual transaction alone may leave the underlying industrial conditions unchanged.

Foreign investment can work in either direction. An internationally owned company that establishes production, R&D, and supplier relationships in the UK can deepen domestic capability, while an acquisition followed by the relocation of strategic control or activity can have the opposite effect. The relevant distinction is the effect on the domestic capability base rather than the nationality of the owner. The 2023 *Independent Review of University Spin-out Companies* is useful in this respect because it shows how early questions of ownership, finance, and location can arise when developing research-based firms.[18] Over time, the cumulative effect can matter more than any single transaction. If production

[17] The cases are set out in Cambridge Industrial Innovation Policy, conceptual framework working paper, 2026, Table 1.
[18] Tracey, I. and Williamson, A. (2023). *Independent review of university spin-out companies: final report*. London: Department for Science, Innovation and Technology / HM Treasury; Leal-Ayala, D., Fan, Z., López-Gómez, C., Rodríguez Rivero, R. and O'Sullivan, E. (2025). *UK performance in technology scale-up*. Cambridge Industrial Innovation Policy, University of Cambridge.

closes, suppliers lose demand, or specialist workers disperse, the shared industrial base available to future firms may become thinner, and although this does not make industrialisation impossible, it can make it more difficult or expensive.

There is an important counterargument: selling young firms, sourcing internationally, and importing manufactured goods can create genuine gains for founders, investors, universities, and consumers. The issue is not that every exit or import represents a national loss. Rather, some production capabilities, supplier relationships, and specialist skills take time to build and are costly to recreate once they disappear. The immediate gains from a transaction are easy to observe; any longer-term effect on the capacity to compete in successor technologies is less visible and may emerge gradually.

The consultation participants made the same argument more directly. One firm cautioned against focusing on domestic production, arguing that the UK should concentrate on retaining core engineering capability while remaining commercially agile, on the grounds that competitors elsewhere will do whatever is necessary to win once a technology is commercial. The point is well made, and the argument developed does not require every technology to be manufactured domestically. It is narrower: where production capability, suppliers, and skills are repeatedly lost, the conditions available to the next generation of firms are weakened.

What this means for innovation policy

Viewed through this wider lens, several familiar measures of innovation performance need to be treated as partial indicators rather than outcomes. Start-up formation, unicorn counts, venture investment, and successful exits are important signs of entrepreneurial and technological dynamism, but they provide limited information about where production, employment, supplier activity, and strategic capability accumulate. A UK company can achieve a high valuation, raise substantial venture finance, or generate a successful return for its founders and investors while undertaking much of its subsequent industrialisation elsewhere. From an industrial policy perspective, the additional question is therefore what productive capabilities and economic value become embedded in the UK as successful technologies and firms scale.

An emphasis on new ventures can also understate the role played by established firms and OEMs in the innovation process. In sectors where product development and production capability are closely connected, larger firms can integrate complex technologies, invest in production systems, qualify and develop suppliers, train specialist workers, and provide demanding first customers for smaller innovative firms. Pisano and Shih describe the wider network of production knowledge, suppliers, skills, and engineering capabilities on which firms draw as an “industrial commons”, arguing that the loss of manufacturing capability can erode the capacity to innovate in subsequent generations of technology.[19] Their analysis of the United States identified examples in areas including displays, semiconductors, and advanced materials where the erosion of production capability was accompanied by the loss of related skills and technological know-how. More recent analysis by the U.S.-China Economic and Security Review Commission makes a related argument, highlighting how China’s dense and interconnected manufacturing capabilities can support innovation across adjacent technologies and industries.[20]

This has an important implication for the organisation of translation. Applied research and intermediary institutions can provide shared technical capability, facilities, and expertise, but they cannot substitute for the production knowledge, systems integration capability, supplier relationships, and market pull held by industrial firms. Effective translation depends partly on the

[19] Pisano, G. P. and Shih, W. C. (2009). Restoring American competitiveness. *Harvard Business Review*, 87(7/8): 114–125.
[20] U.S.-China Economic and Security Review Commission (2025). *2025 Annual Report to Congress*, Chapter 6, “Interlocking Innovation Flywheels: China’s Manufacturing and Innovation Engine”, pp. 313–369. Washington, DC: U.S.-China Economic and Security Review Commission.

relationships between research and innovation institutions and the primes and industrial users able to take technologies towards production and deployment.

Understanding scale-up in these terms also widens the relevant unit of analysis from the individual firm to the surrounding industrial ecosystem. A firm's ability to grow depends partly on its own technology, management, and access to finance but also on whether it can draw on specialist suppliers, production facilities, skilled workers, engineering expertise, infrastructure, customers, and other complementary assets at the point they are required. These capabilities are often shared across many firms and accumulate over time. Their presence can make it easier for successive generations of companies to industrialise; their erosion can increase the cost and difficulty of doing so. Supplier development, shared industrial infrastructure, workforce capability, and the strength of established firms are therefore part of the scale-up agenda rather than separate issues that become relevant only after individual companies have grown.

The same qualification applies to the role of venture capital. Risk capital is essential for many innovative firms, and the UK's ability to create and finance technology companies is an important asset, but it does not provide all of the capabilities required for every form of innovation-led growth. Capital-intensive technologies can require long development periods, pilot and demonstration facilities, specialised equipment, production engineering, certification, supplier development, and large investments in manufacturing capacity before substantial revenues emerge. Recent UK policy towards AI hardware, for example, explicitly recognises that high upfront costs, long development cycles, and delayed returns create financing requirements that differ from those of software-led ventures and require long-term patient capital alongside specialist infrastructure and support.[21]

A broader interpretation of innovation by Breznitz argues that innovation should not be equated with invention or with reproducing the Silicon Valley model of technology entrepreneurship: economies can create value through different stages of production and innovation, including the adaptation, production, and continuous improvement of technologies developed elsewhere.[22] The implication for UK policy is not to reduce support for frontier technology or high-growth start-ups but to recognise that innovation-led growth can follow several pathways and may require different combinations of firms, finance, production capability, and institutions.

These arguments do not imply that start-ups, venture capital, foreign investment, or successful exits are undesirable, but they do change the criterion against which their contribution should be judged. For an industrial strategy concerned with sustained growth and value capture, policy needs to consider not only whether the UK generates inventions and new firms but also whether the process of developing and scaling them strengthens the capabilities through which future innovation can be industrialised in the UK. Innovation policy should therefore assess success at both levels: the performance of individual technologies and firms; and the accumulation of productive capability across the sectors and ecosystems on which they depend.

This gives the argument in Section 1 a single organising objective: system-level value capture. The term describes the alignment of technological opportunity with the production, supplier, workforce, infrastructure, finance, and market capabilities required to manufacture and scale an innovation, and to retain the resulting value in the UK. It is deliberately broader than research commercialisation, which asks whether knowledge reaches a market. System-level value capture asks whether the capabilities that allow the UK to produce, improve, and benefit from that knowledge accumulate domestically, and this is the standard against which the institutional assessment in Sections 2–4 is conducted.

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[21] Department for Science, Innovation and Technology (2026). *UK AI Hardware Plan*. London: Department for Science, Innovation and Technology. Published 8 June 2026.

[22] Breznitz, D. (2021). *Innovation in Real Places: Strategies for Prosperity in an Unforgiving World*. New York: Oxford University Press. https://doi.org/10.1093/oso/9780197508114.001.0001

Table 1 summarises the wider implications of this argument for a number of recurring innovation policy assumptions. The intention is not to reject the indicators or policy approaches listed but to show what each one leaves unresolved when the objective extends from innovation activity to industrial capability and retained value.

TABLE 1. COMMON POLICY ASSUMPTIONS AND WHAT THE EVIDENCE SUGGESTS INSTEAD

COMMONLY HELD	WHAT THE EVIDENCE SUGGESTS
Pushing technologies up the readiness scale is the objective	Readiness measures maturity, not value captured. A technology can reach a high readiness level in the UK and be industrialised abroad, taking the value with it.
More unicorns will close the gap	Unicorn counts measure the creation of high-value firms, not the capture of industrial value at home. The UK leads on unicorns while its captured manufacturing value added has roughly halved as a share of the economy.
Value capture is market capitalisation	A firm's value can be captured abroad through foreign ownership or an overseas listing while little remains here. National value is value added, employment, tax and retained capability.
Spinouts are the main route to national value	The model reaches a narrow set of sectors and leaks at the exit: most UK spinout flotations since 2012 have been overseas, and most large rounds are led by overseas investors.
Venture capital will finance scale-up	Venture capital suits capital-light, fast-exit models and under-serves capital-intensive hard technology; it also rewards early acquisition and overseas listing.
Incumbents are yesterday's economy	Established firms and primes anchor scale-up — providing demand and directionality for suppliers, developing the workforce, and acting as anchor tenants for the industrial commons.
The industrial commons will look after itself	It is a public good that erodes quietly, firm by firm, and its loss forecloses the ability to innovate in the next generation of products. It has to be maintained deliberately.
Choosing priority sectors is an industrial strategy	Selecting sectors is half of a strategy. Without securing the conditions under which those sectors capture value at home, sector choice alone does not stop the value being realised elsewhere.

SOURCE: CIIP ANALYSIS.

These considerations provide the basis for the subsequent institutional analysis. Section 2 examines whether the UK institutional system is configured for system-level value capture – whether responsibility is assigned with comparable clarity across technology development and the wider manufacturing, supply chain, and industrial development capabilities required for scale.

2) Is the UK configured to capture industrial value?

The UK's institutional landscape is well populated across the conventional functions of an innovation system. The more revealing question is what happens as technologies move towards industrialisation. The institutions assessed undertake substantial work in manufacturing, finance, skills, and supply chains, but these activities are much less often part of an organisation's defined remit than research, validation, and technology development. The analysis in this section therefore focuses on how responsibility is distributed rather than whether industrial development activity exists at all.

The section begins with the evolution of the UK policy debate, then maps the current institutional landscape, and finally examines the institutions against 4 readiness dimensions and 18 functions. This allows the discussion to move from the presence of organisations to the more specific question of where formal responsibility is concentrated and where it is more diffuse.

2.1 The current debate on the UK's innovation system: from bridging the "valley of death" to building industrial capability

The debate has moved from identifying a missing translational layer to examining the wider system through which innovation becomes industrial capability. The literature also makes clear that no single explanation accounts for the UK's scale-up and value-capture challenges.

The modern debate began with Hermann Hauser's clear institutional diagnosis. His 2010 review argued that the UK combined a world-class research base with an underdeveloped layer between academic discovery and commercial application.[23] Universities could generate knowledge and early proofs of concept, and firms could exploit technologies once the technical and commercial risks had fallen. Between them, the UK had insufficient business-facing capacity to mature technologies, develop demonstrators and manufacturing processes, and provide access to specialist facilities that individual firms could not justify purchasing. The resulting Technology and Innovation Centres, later renamed Catapults, were intended to supply that translational infrastructure and to connect business, academia, and government.

This original rationale rests on a collective action argument that remains central to this report: the capabilities most needed at the point of industrialisation – pilot production capacity, shared facilities, test and qualification infrastructure, standards, supplier coordination, and specialist workforce development – are typically properties of a value chain rather than any single firm. An individual company may lack the incentive or capacity to build them alone, even where the competitiveness of the whole sector depends on them. The distinctive public purpose of RTOs, Catapults, and comparable bodies is therefore to supply capabilities at system level that firms cannot economically provide individually rather than acting as a bridge between research and individual companies.

Later reviews broadly endorsed the rationale but shifted attention from the existence of intermediary organisations to their performance. Hauser's follow-up review called for scale, business engagement, and long-term commitment; the 2017 independent review found that the concept was sound but implementation and collaboration were uneven; and the 2021 government review raised continuing

[23] Hauser, H. (2010). *The Current and Future Role of Technology and Innovation Centres in the UK*. London: Department for Business, Innovation and Skills.

questions about industrial reach, accessibility, and the funding of capabilities.[24] The central question became whether mandates, incentives, and operating models allowed Catapults to fulfil their intended role.

This "under the hood" perspective revealed less visible frictions. Some smaller firms have limited awareness of Catapult services; eligibility and overhead rules can inhibit projects involving several RTOs; and the "thirds" funding model can create pressure to earn commercial income. This pressure may encourage Catapults to compete with universities, smaller firms, or private technology service providers rather than concentrating on genuinely additional activity.

The interviewees consulted for this study described the same effect from the user side. Smaller firms reported that charges for access to shared facilities can be prohibitive, meaning they can be drawn to subsidised facilities in other countries. Several also described a mismatch of pace rather than capability: one firm noted that the facilities were excellent but decision cycles measured in months are difficult to reconcile with the speed at which a small company must operate; and another observed that the administrative burden attached to a small collaborative project was indistinguishable from that attached to one 20 times larger. A former employee of one such institution attributed this to accumulated governance requirements rather than the institution's purpose. The debate therefore moved beyond filling an organisational gap to asking how institutions are governed, connected, and financed over the long periods that industrial scale-up requires.

Geopolitical and economic change has widened the frame. The financial crisis, the pandemic, disrupted supply chains, the energy transition, strategic rivalry, and concerns about economic security have led the United States and Europe to reconsider the relationship between science, innovation, and industrial policy. Policies for semiconductors, batteries, clean technologies, defence, and critical supply chains increasingly recognise that scientific leadership does not automatically produce domestic manufacturing capability or strategic control. The concern is that a country can excel at research and early invention while importing the equipment, components, and production capabilities needed to commercialise them. Western economies acknowledge that they cannot just be the research and development centres of the world: they also require the capacity to engineer, demonstrate, manufacture, and deploy technologies at scale. The policy question is therefore not only whether a research centre becomes a company but also whether it produces domestic industrial capability, exports, skilled employment, and retained strategic value. Table 2 sets out the principal strands of the UK literature and what each one finds.

TABLE 2. THE STRANDS OF THE UK DEBATE, AND WHAT EACH ONE FINDS

Strand of the debate	What the literature finds	Principal sources
Relationships, incentives, and coordination	Collaboration is constrained by fragmented brokerage, misaligned incentives, contractual and intellectual property complexity, and limited movement of people between academia and industry. Coordination also fails across government: a firm may pass from a research council to Innovate UK, a Catapult, the British Business Bank, and the National Wealth Fund, but these do not operate as a continuous pathway. Discontinuities in eligibility, funding size, readiness thresholds, and decision times can leave firms stranded even when each institution is meeting its own remit.	Wilson (2012); Witty (2013); Dowling (2015); Tracey and Williamson (2023); Nurse (2023); Norris and Adam (2017)
The balance and operating model of the system	Universities are expected to deliver curiosity-driven research, applied development, commercialisation, skill, and regional growth through the same incentives and a financially fragile operating model. UK spending places greater emphasis on basic research, and less on experimental development, than many OECD peers, while peer systems spread activity across national laboratories and applied	Cambridge Industrial Innovation Policy (2025); Nurse (2023)

[24] Hauser, H. (2014). *Review of the Catapult network: recommendations on the future shape, scope and ambition of the programme*. London: Department for Business, Innovation and Skills; Ernst & Young LLP (2017). *Catapult Network Review*. London: Department for Business, Energy and Industrial Strategy; and Department for Business, Energy and Industrial Strategy (2021). *Catapult Network Review*. London: Department for Business, Energy and Industrial Strategy.

	research organisations. More early-stage grants will not by themselves create pilot plants, production engineers, specialist suppliers, or factories.	
Industrialisation capability and complementary assets	A prototype may work scientifically yet be impossible to manufacture reliably, affordably, or at volume. Firms need pilot lines, testbeds, realistic operating environments, contract manufacturers, component suppliers, certification expertise, and routes into production. Where domestic suppliers are absent, firms build capability internally or rely on overseas partners, increasing the likelihood that production is later located abroad. Primes supply technological direction, demanding first customers, trained engineers, and the industrial commons.	House of Commons Science and Technology Committee (2013); Department for Business, Energy and Industrial Strategy (2021); Cambridge Industrial Innovation Policy (2025)
Finance, ownership, and value capture	Venture investors hesitate to finance manufacturing assets, conventional lenders require collateral that young firms lack, and fragmented domestic institutional investors may lack the scale or specialist expertise to assess complex technologies. Foreign investment is not inherently negative: the critical issue is what remains anchored in the UK afterwards – research and development, production, intellectual property, headquarters' functions, supplier relationships, and strategic decision-making. Aggregate measures of venture investment, start-ups, or patents can overstate how much later-stage benefit the UK retains.	House of Lords Science and Technology Committee (2025); Royal Academy of Engineering (2024); Roupakia and Coates Ulrichsen (2025); Cambridge Industrial Innovation Policy (2025)
Demand, regulation, and adoption	Firms can reach technical viability without securing a substantial first customer. Public procurement is described as risk-averse, administratively burdensome, and favourable to established suppliers; unclear or slow standards, testing, and certification pathways add delay in regulated sectors. Diffusion also depends on users' absorptive capacity: a mature product can spread slowly where adopters lack complementary capabilities or incentives.	House of Lords Science and Technology Committee (2025); National Audit Office (2023); Department for Business and Trade, Department for Science, Innovation and Technology and HM Treasury (2025)
Beyond the innovation system proper	High energy costs, expensive or unsuitable industrial space, slow planning and permitting, difficult grid connections, weak local supply chains, and the cost of recruiting specialised workers all shape where firms build pilot lines and factories. Skills constraints extend well beyond scientists to production engineers, technicians, process and quality specialists, and regulatory professionals, which makes immigration policy part of innovation policy.	ScaleUp Institute (2025); Royal Academy of Engineering (2024); Office for National Statistics (2025); Cambridge Industrial Innovation Policy (2025)

SOURCE: CIIP SYNTHESIS OF THE REVIEWED LITERATURE.

Critical assessment

Taken together, the literature does not support a single explanation for the UK's scale-up and value-capture problem. Hauser identified an important gap in the translational layer, but subsequent work shows that creating intermediary organisations is only part of the answer. Their contribution also depends on operating models, accessibility, incentives, and the wider environment through which firms move from shared facilities into finance, production, and markets.

Different technologies also encounter different combinations of constraints. An asset-light software company may primarily need talent, customers, and growth capital. Biotechnology may require laboratories, clinical trials, regulation, and patient finance. And batteries, semiconductors, or advanced materials may require pilot lines, reliable energy, industrial land, specialist equipment, and dense supplier networks. Addressing one barrier in isolation may have limited effect, because the requirements are mutually reinforcing.

The debate has therefore broadened from institutional gaps to the wider conditions through which innovation becomes industrial capability. These include university–industry relations, institutional operating models, policy stability, public finance, demonstration infrastructure, suppliers, primes, regulation, procurement, adoption, skills, and growth capital, alongside framework conditions such as energy, migration, planning, tax, and infrastructure. No single department or agency controls this full set. The question for this report is narrower: how far are the institutional functions associated with technology development and industrial development clearly assigned within the existing landscape?

Previous reviews have identified many of the barriers, from the translational gap highlighted by Hauser, to the coordination and accountability issues raised by Nurse, and the finance, procurement, infrastructure, and market access constraints emphasised in more recent scale-up reviews. The contribution of this study is narrower: rather than re-diagnosing these barriers, it systematically maps where responsibility for technology development and industrial development functions is formally assigned, and where it becomes more diffuse as technologies approach production and scale.

2.2 Institutional overview of the UK industrial innovation system

The UK combines two forms of institutional provision: cross-sector organisations whose remits are defined mainly by function; and sector-specific organisations whose mandates are tied to particular industries. Every layer of the horizontal map is populated, while the sector-specific tier varies considerably in form and density.

Much of the debate described above concerns the innovation system in the narrower sense: the institutions that generate knowledge and help to translate it into commercial use. Value capture depends on a wider set of arrangements. Supply chain development, production finance, demand, skills, and investment anchoring sit partly outside the conventional innovation map, yet they can be decisive once a technology approaches industrial scale. For that reason, this report uses the term “industrial innovation system” to encompass the innovation institutions and wider organisations that shape industrial development.

Seen this way, the UK system is not just a pipeline from research to market but a set of overlapping institutions that can influence research, translation, production capability, adoption, productivity, and the location of economic value. The question is therefore not whether the UK can generate research excellence – an area of established strength – but how the surrounding institutional landscape supports the development of commercially viable products, production systems, scale-up firms, and high-value industrial activity.

One distinction is useful before turning to the map. Some organisations work horizontally across many sectors because their remit is defined by a function – UKRI, Innovate UK, the British Standards Institution, and the British Business Bank are examples. Others have an explicit sector mandate, such as the Aerospace Technology Institute (ATI), the Advanced Propulsion Centre (APC), the Society of Motor Manufacturers & Traders (SMMT), and the Office for Life Sciences (OLS). The two forms are complementary: horizontal bodies can provide common capabilities across the economy, while sector-

specific organisations can attend to the technologies, firms, supply chains, and market conditions of an industry.

Many of the mappings reviewed concentrate on the horizontal architecture. This is a useful way to describe the national system, but it can make sector-level coordination less visible. The analysis therefore reads the UK landscape in both directions: across economy-wide functions and within selected sectoral ecosystems.

Horizontal institutions

Figure 5 organises the main cross-sector institutions into four broad layers. The purpose is not to imply a strict hierarchy but to show the different roles that together shape the path from knowledge creation to industrial use.

Layer 1 – governance, strategic direction, and the rules of the game. The institutions that set strategic priorities, allocate public resources, shape framework conditions, and define incentives for the rest of the system: Number 10 and the Cabinet Office, the Treasury, and DBIST, together with the public funding system and the regulatory and framework institutions that shape the conditions in which firms operate. This layer has become more strategically salient as industrial strategy has returned to the centre of the growth agenda, marking a shift from a generic innovation policy model towards a more explicitly industrial one.

Layer 2 – the core innovation pipeline. The principal actors directly involved in generating, translating, and exploiting knowledge: universities and public research organisations; applied research and translation organisations, including the Catapult Network, the National Physical Laboratory, and specialist institutes; and the industrial system of large firms, smaller enterprises, scale-ups, primes, and sector associations. This layer should be understood as a pipeline from ideas to industrial and market value, but not as a linear one. Industrial needs shape research agendas, research discoveries generate new firms and markets, and large firms provide directionality, supply chain pull, standards, specialist skills, and routes to market.

Layer 3 – enabling foundations. The basic enablers that allow the pipeline to function: the skills and workforce system; the finance and investment system; and the infrastructure for intellectual property, standards, testing, certification, adoption, and diffusion. Weaknesses can prevent even strong research and promising technologies from progressing to industrial capability, which is why the layer is treated as the base of the system rather than peripheral support.

Layer 4 – demand, place, and access to final users. The layer that connects the system to demand, public missions, regional ecosystems, and final users, including devolved administrations, combined authorities, and place-based programmes, alongside the mission and procurement actors. Innovation scales not in the abstract but through customers, users, procurement routes, regulatory approval, demonstration environments, supply chains, and places.

Vertical institutions: aerospace, automotive, and life sciences

Figure 6 applies the same four layers to aerospace, automotive, and life sciences. It is an inventory rather than an assessment of performance, showing where sector-specific mandates sit before Section 2.3 examines these organisations in more detail. The comparison highlights three features of the sectoral landscape:

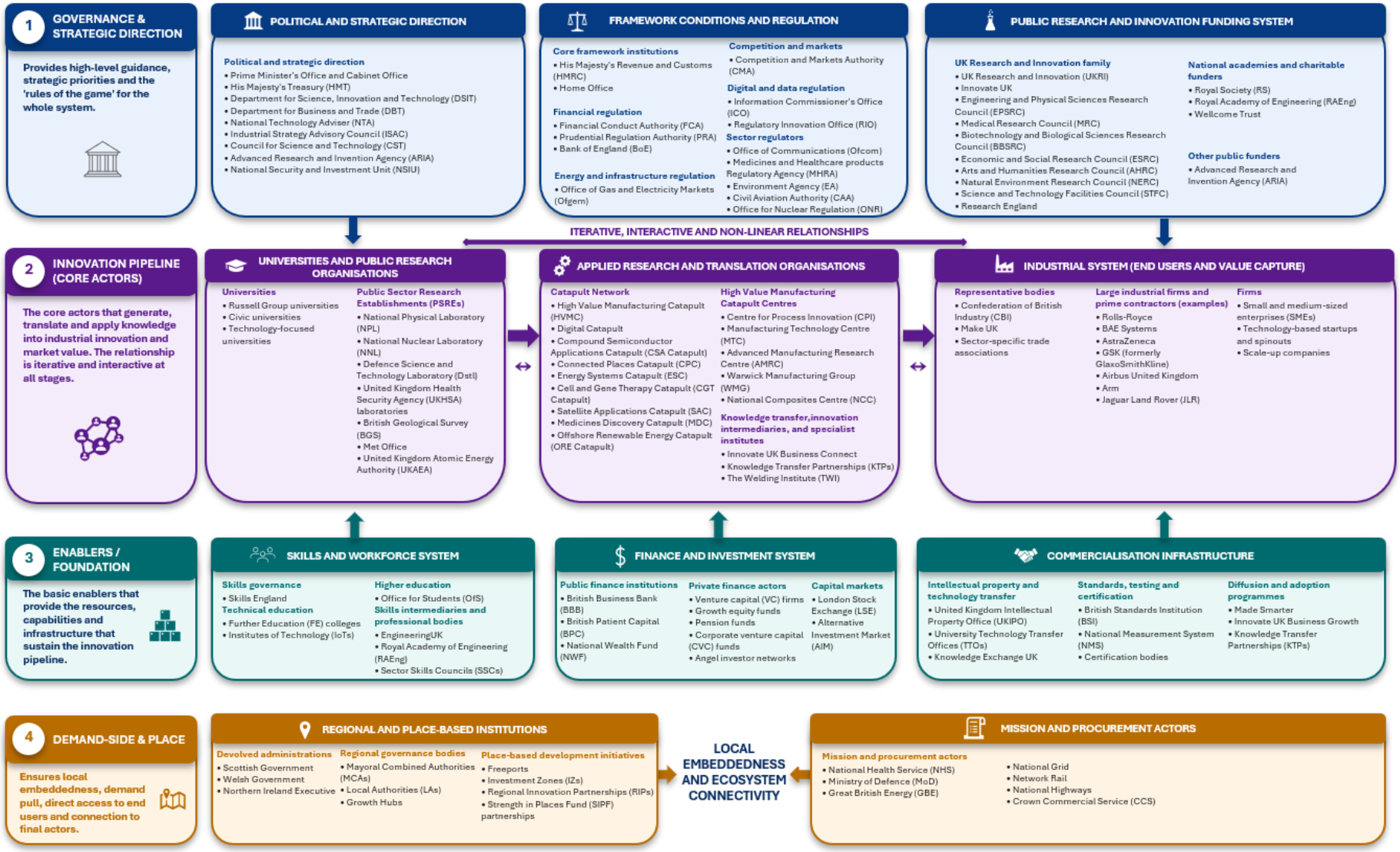
- Every layer is occupied in every sector, but by bodies of markedly different character. The strategic layer is held by a government–industry partnership in aerospace, by a ministerially co-

chaired council in automotive, and in life sciences by a departmental secretariat, alongside an advisory council that meets twice a year. Presence at a layer alone says little about the authority attached to it.

- The innovation pipeline tier is populated unevenly. Aerospace and automotive each have a single dedicated technology institute with a co-funding mandate: the ATI and the APC, respectively. Life sciences has no equivalent single body: its translational capacity is distributed across two Catapults, a national research institute, and a manufacturing innovation centre.
- The balance between public bodies, regulators, and industry associations differs by sector. Regulation sits inside the strategic layer in all three cases – the Civil Aviation Authority, the Vehicle Certification Agency, the medicines regulator, and the assessment body – but its relationship with demand differs, and each sector's representative body occupies a different position relative to government.

Taken together, these sector maps show how different institutional forms can occupy similar positions in the system. The next question is whether they also carry the industrial development responsibilities needed as technologies move towards production and scale.

FIGURE 5. THE UK INDUSTRIAL INNOVATION SYSTEM: OVERVIEW OF HORIZONTAL ORGANISATIONS



SOURCE: CIIP ANALYSIS.

FIGURE 6. EXAMPLE OF SECTORAL (VERTICAL) INSTITUTIONS IN THE UK INDUSTRIAL INNOVATION SYSTEM

	AEROSPACE	AUTOMOTIVE	LIFE SCIENCES
1 GOVERNANCE & STRATEGIC DIRECTION	• Aerospace Growth Partnership (AGP) • DBT aerospace directorate • Civil Aviation Authority (CAA)	• Automotive Council • DBT automotive directorate • Vehicle Certification Agency (VCA) • Zero-emission vehicle mandate (DfT)	• Office for Life Sciences (OLS) • Life Sciences Council • MHRA · NICE
2 INNOVATION PIPELINE (CORE ACTORS)	• Aerospace Technology Institute (ATI) • UK Aerospace Research Consortium (11 universities) • Rolls-Royce University Technology Centres • HVM Catapult: NCC, AMRC, MTC, AFRC • Primes: Rolls-Royce, Airbus UK, GKN Aerospace, • Spirit AeroSystems, Leonardo	• Advanced Propulsion Centre (APC) • Faraday Institution • HVM Catapult: MTC, WMG • UK Battery Industrialisation Centre (UKBIC) • Primes: JLR, Nissan, BMW, Toyota, Stellantis; AESC and Agratas (cells)	• National Institute for Health and Care Research • Universities and research institutes • Cell and Gene Therapy Catapult • Medicines Discovery Catapult • Medicines Manufacturing Innovation Centre (CPI) • Primes: AstraZeneca, GSK
3 ENABLERS / FOUNDATION	• ATI Programme co-funding (with Innovate UK) • National Aerospace Technology Exploitation Programme (NATEP) • Sharing in Growth (closed)	• DRIVE35 capital and R&D grants • Automotive Transformation Fund (legacy) • Scale-up Readiness Validation (SURV) • Technology developer accelerator	• Life Sciences Innovative Manufacturing Fund • BioIndustry Association
4 DEMAND-SIDE & PLACE	• CAA Innovation Hub and regulatory sandbox • ADS Group • Regional aerospace alliances • Ministry of Defence as anchor customer	• Society of Motor Manufacturers and Traders • ZEV mandate as demand instrument • Regional clusters: North East, West Midlands • Thatcham Research	• NHS as lead customer • NICE assessment and reimbursement • Genomics England · Our Future Health • Clusters: Cambridge, Oxford, Stevenage

SOURCE: CIIP ANALYSIS.

The maps provide a useful overview, but the practical difficulties of industrial translation become clearer when the journey is seen from the perspective of a technology or firm. Progress is rarely linear. Technical performance, manufacturability, supply chain readiness, regulatory compliance, business model validation, and customer adoption often need to advance in parallel, and progress in one dimension can reveal a constraint in another. A technology may work in the laboratory but remain too costly to manufacture; a prototype may depend on components that no domestic supplier makes; a product may be technically ready but still lack regulatory approval, customer confidence, production finance, or a route to market. Table 3 summarises the barriers identified in the literature and stakeholder interviews, using the same four-layer structure as Figures 5 and 6.

TABLE 3. SUMMARY OF UK INDUSTRIAL INNOVATION SYSTEM BARRIERS

Layer	Barriers identified in the UK context
Layer 1 – Strategic direction	• Policy instability and changing priorities • Gaps across public finance pathways • Restrictive funding models for applied research institutions • Financial fragility of universities and research organisations
Layer 2 – Innovation pipeline	• Slow and unattractive university commercialisation deals • Limited venture-building capability and incentives for researchers • Poor access to industrialisation facilities and expertise • Slow or unclear regulation and certification • Weak domestic anchoring and value capture
Layer 3 – Enablers and foundations	• Insufficient scale-up and patient capital • Costly and constrained industrial infrastructure • Shortages of technical and scale-up skills • Weak firm and user capacity to adopt technology
Layer 4 – Demand and place	• Limited access to lead customers and markets • Weak innovation-oriented public procurement • Uneven regional access to scale-up capabilities

SOURCE: CIIP ANALYSIS.

The stakeholder interviews reinforce the cumulative nature of these barriers: individual obstacles may be manageable in isolation, but together they can add time, cost, and risk to the journey from research to production and make alternative locations, investors, or partners more attractive.

2.3 What the institutions do: functional coverage

The institutional assessment shows a dense concentration of activity around research and technology development. Industrial development activity is also widespread, but it is less often embedded in an organisation's defined remit. The distinction that matters is therefore not simply between activity that exists and activity that does not, but between functions with a clear institutional home and those delivered more diffusely across the system.

To examine this distinction, the study uses two complementary lenses. One follows the maturity of a technology across different dimensions of readiness, and the other looks at the type of function an institution is expected to perform:

- **The readiness lens locates institutional activity along four scales that are usually considered separately.** Technology readiness, originating in NASA and codified by Mankins (1995), asks whether the technology works. Manufacturing readiness, developed by the U.S. Department of Defense, asks whether it can be produced reliably and at scale. Supply chain readiness considers whether the necessary suppliers and inputs can deliver, while business and market readiness asks whether there is a viable route to customers and recurrent revenue.

Read together, the four scales show where organisations act along different development journeys; the purpose is not to assess the maturity of individual technologies but to identify where institutional activity and responsibility are concentrated or more diffuse.

- **The functional lens asks a different question: what kind of work is each institution set up to do?** It builds on the functions tradition in innovation systems research, particularly Hekkert et al. (2007) and Bergek et al. (2008), and on O'Sullivan's manufacturing innovation support characterisation framework (2024). The original framework identifies nine activities associated with technology development. For this study, a second family of nine functions has been added to capture sector strategy, coordination, and resource mobilisation – areas that are increasingly important when the objective is not only to mature a technology but also to build industrial capability around it.

FIGURE 7. THE TWO FRAMEWORKS USED TO ASSESS UK INSTITUTIONS

Left: how far a technology has travelled. Right: what an institution actually does.

FOUR READINESS QUESTIONS

Does it work?	TECHNOLOGY
TRL 1-3	Research and feasibility
TRL 4-6	Validation and prototyping
TRL 7-9	Demonstration, qualification, operation

Can we make it?	MANUFACTURING
MRL 1-3	Manufacturing concept and industrial base assessment
MRL 4-6	Process development and pilot capability
MRL 7-10	Production readiness, rate and quality

Can the chain deliver it?	SUPPLY CHAIN
SCRL 1-3	Chain identification and mapping
SCRL 4-6	Supplier qualification and multi-tier coordination
SCRL 7-9	Domestic content, resilience and rate

Will it sell, at scale?	BUSINESS & MARKET
B&MRL 1-3	Concept and market identification
B&MRL 4-7	Model validation to product/market fit
B&MRL 8-10	Scaling on recurrent revenue

A technology can be ready on one and nowhere near ready on another. Most UK support instruments are built around the first question alone.

EIGHTEEN ACTIVITIES, IN TWO FAMILIES

FAMILY A DEVELOPING TECHNOLOGIES

Research and development for knowledge generation
- F1 Proof of concept / application feasibility (TRL 2-3)
- F2 Concept validation in lab environment (TRL 4-5)
- F3 Prototype demonstration, realistic environment (TRL 6-7)
- F4 System demonstration, real-world environment (TRL 8-9)

System development for knowledge diffusion
- F5 Standards, regulation, norms and IP
- F6 Technology knowledge exchange and networking
- F7 Technology intelligence and foresight

Capability development for knowledge application
- F8 Training, skills and education
- F9 Access to expertise and facilities

FAMILY B DEVELOPING SECTORS

Sector strategy
- G1 Sector roadmapping and foresight
- G2 Market demand articulation and intelligence
- G3 Guiding direction of search (sector level)

Sector coordination
- G4 Supply chain development and qualification
- G5 Network development and cluster building
- G6 Entrepreneurship and venture building

Resource mobilisation
- G7 Scale-up and patient capital provision
- G8 Targeted investment attraction and anchoring
- G9 Industrial skills and workforce mobilisation

The left family builds technologies. The right family builds the sector that turns them into production, supply chains and retained value.

SOURCE: ADAPTED FROM O'SULLIVAN (2024), WITH THE SECTORAL INDUSTRIAL DEVELOPMENT FAMILY ADDED FOR THIS STUDY. THE FRAMEWORK IS AN INTERNAL CSTI DOCUMENT, USED WITH THE AUTHOR'S PERMISSION.

How the assessment was made, and what it can and cannot support

The institutions identified in Section 2.2 were assessed against both frameworks. For each classification, Annex 1 records the named programme, fund, facility, or statutory duty, and the source used to support it. The exercise followed three simple rules:

1. An institution is marked against an activity only where a named programme, fund, facility, or statutory duty could be identified. A general statement of purpose in a strategy document does not qualify.

2. Where an institution is marked, the assessment distinguishes between activities that are a defined responsibility – named in the remit, strategy, or founding document and supported by a standing instrument – and activities undertaken on a contributory basis, for example through a programme that is secondary to the institution's main purpose or limited to a particular sector or part of the economy. A blank means no published activity was identified in the sources consulted; it does not mean the activity is absent.
3. The evidence base is publicly available material: founding documents and statutory instruments; departmental strategies and Industrial Strategy Sector Plans; published remits, corporate strategies, annual reports, and accounts; programme guidance, eligibility criteria, and award announcements; and National Audit Office and parliamentary material.

The results should also be read with four methodological qualifications in mind:

1. **This is a qualitative assessment that involves judgement.** Analysts working from the same documents would place some institutions differently, particularly at the boundary between a defined responsibility and something done alongside other work. The published record is also uneven: a well-documented body can appear more active than a less well-documented one doing similar work. The assessment is best read as a structured description of where responsibility for each activity is formally lodged, not as a precise measurement.
2. **It does not evaluate performance.** It records what institutions are mandated and equipped to do, not how well they do it. An institution with a defined responsibility may discharge it poorly; one marked as acting alongside its main purpose may do so with distinction. Nothing that follows should be read as a judgement of any institution's effectiveness.
3. **It is a point-in-time record, as of August 2026.** The Automotive Transformation Fund now sits inside DRIVE35; Innovate UK's Smart Grants have been paused since January 2025;[25] the Department for Business and Trade's Supply Chain Centre was 2 months old when this report was written; and the Nuclear Advanced Manufacturing Research Centre's (Nuclear AMRC's) staff and equipment transferred into the AMRC on 1 April 2025, where the work continues as the centre's nuclear manufacturing group.[26]
4. The coding was not forced to fit the analytical questions. Where the documentary evidence pointed in a different direction from the expected pattern, those cases were retained and are discussed below.

How far the system takes a technology

Twenty-six cross-sector institutions operate an instrument that acts at a defined stage of maturity. Their coverage is not evenly distributed across the four readiness dimensions shown in Figure 8:

- **Technology Readiness Level (whether a technology works):** the mapping identifies numerous instruments supporting research, concept validation, prototyping, and demonstration. Several institutions have these stages as part of their defined remit, but the assessment does not evaluate whether the overall level of funding or coordination between programmes is sufficient.
- **Manufacturing Readiness Level (whether it can be made):** almost as many organisations appear in this part of the mapping as on technology readiness, including the High Value Manufacturing Catapult centres, the Centre for Process Innovation, and the UK Battery Industrialisation Centre. A smaller share, however, treat manufacturing readiness as a defined responsibility. No cross-sector institution was identified with a standing responsibility for the

[25] Innovate UK (2026). *Smart Grants funding guidance*. Swindon: UK Research and Innovation. Last updated 26 August 2026.
[26] Forty-two staff transferred into the AMRC on 1 April 2025 to form the centre's eighth nuclear manufacturing group; the University retained the Rotherham facility and more than £35 million of equipment. See AMRC, New group strengthens nuclear at AMRC.

earlier system-level question of whether a technology could be manufactured in the UK and whether the necessary industrial base exists.

- **Supply Chain Readiness Level (whether the supply chain can deliver):** Figure 8 shows the sparsest of the four columns. Eleven cross-sector institutions act at the chain identification and mapping stage, ten at supplier qualification and multi-tier coordination, and five at domestic content, resilience, and rate – against twenty-two at each of the middle and late stages of technology readiness, with only three green cells in total (i.e. the number treating the stage as a defined responsibility). The two entries at the supplier qualification stage are the AMRC's nuclear manufacturing group, through Fit For Nuclear, and the Offshore Renewable Energy Catapult, through Fit For Offshore Renewables – both Catapult centres and each running a programme confined to a single sector. In the sector-mandated block beneath, the same column records four bodies acting and none holding the stage as a defined responsibility.

- **Business and Market Readiness Level (whether a technology or product can sell at scale):** the number of institutions remains relatively stable across the three stages, but formal responsibility is less concentrated than on technology readiness. Fourteen cross-sector institutions act at concept and market identification, eighteen at model validation and product–market fit, and eleven at scaling on recurrent revenue. Defined responsibility is held by five, five, and three institutions, respectively. Two public finance instruments illustrate a possible discontinuity within this landscape: the British Business Bank's Growth Guarantee Scheme is capped at £2 million per business group, while the National Wealth Fund's minimum ticket for private investment is £25 million, and its deals are typically larger.[27] These two programmes alone do not establish the size of any overall financing gap, although interviewees described a recurring difficulty finding suitable channels for capital-intensive firms, particularly between early-growth finance and large-scale infrastructure or investment finance.

Looking across the four readiness dimensions, the main change is not a sharp fall in the number of organisations present as a technology progresses. Supply chain readiness is the clearest exception. What changes more consistently is the status of the activity within institutional mandates. Each technology readiness stage is a defined responsibility for between nine and sixteen institutions; across the nine stages of manufacturing, supply chain, and business/market readiness, no stage reaches more than five.

The consultation participants described this pattern from the other side. Firms in several sectors reported strong and well-signposted support up to prototype or advanced prototype, followed by a marked discontinuity. One described receiving support at the earliest stage to take an idea to an advanced prototype and finding that "there was basically nothing after that". Another, working on production equipment, said something similar: the system is effective from a research and concept perspective, but when the task becomes making the product, "the support over there kind of vanishes", with the available grants and surrounding expertise thinning at the same point. A third observed that where a company moves into manufacturing or scale-up, "the grants kind of dwindled, and also the understanding…". What participants asked for was not a further programme but a progression: a structured route through successive stages rather than, in one firm's description, a series of isolated calls into which a technology must be made to fit.

[27] British Business Bank, Growth Guarantee Scheme, scheme terms, https://www.british-business-bank.co.uk/finance-options/debt-finance/growth-guarantee-scheme (accessed August 2026); National Wealth Fund, Investment principles, https://www.nationalwealthfund.org.uk/private-sector-finance/investment-principles/ (accessed August 2026).

The industrial innovation functions of the cross-sector system

Figure 9 shows that cross-sector institutions undertake a considerable amount of industrial development work. Innovate UK supports ventures and clusters; Research England funds commercialisation; devolved development agencies attract investment; and Catapult centres support suppliers and workforce development in particular sectors. The issue is therefore not a simple absence of activity.

FIGURE 8. HOW FAR UK INSTITUTIONS TAKE A TECHNOLOGY: CROSS-SECTOR INSTITUTIONS ABOVE, SECTOR-MANDATED BODIES BENEATH, AGAINST THE SAME 12 STAGES

Institutions operating a named instrument that acts at a defined stage of maturity

HOW TO READ THIS FIGURE

Each of the four dimensions is divided into three stages, early to late. An institution is marked at a stage where it runs a named programme, fund or duty that acts there.

C the stage is a defined part of what the institution exists to do. P it acts there, but through a programme that is secondary, partial or small.

Cross-sector bodies are shown first; sector-mandated bodies beneath use the same columns, so how far each takes a technology can be compared directly.

INSTITUTION		TRL			MRL			SCRL			B&MRL		
		TRL 1-3 Research and feasibility	TRL 4-6 Validation and prototyping	TRL 7-9 Demonstration, qualification, operation	MRL 1-3 Manufacturing concept and industrial base assessment	MRL 4-6 Process development and pilot capability	MRL 7-10 Production readiness, rate and quality	SCRL 1-3 Chain identification and mapping	SCRL 4-6 Supplier qualification and multi-tier coordination	SCRL 7-9 Domestic content, resilience and rate	B&MRL 1-3 Concept and market identification	B&MRL 4-7 Model validation to product/market fit	B&MRL 8-10 Scaling on recurrent revenue
HORIZONTAL													
UKRI research councils	H	C	C	P	P	P					P	P	
Research England	H	C	P								C	P	
Innovate UK	H	P	C	C	P	P	P	P	P		C	C	P
Advanced Research and Invention Agency	H	C	C	P	P	P					C	P	
Dstl and MOD science and technology	H/v	C	C	C	P	P	P	P	P	P	P	P	P
Universities, research institutes and TTOs	H	C	C	P	P	P	P	P	P		C	P	P
National Physical Laboratory (incl. NMS)	H	C	C	P	P	P	P	P					
HVM Catapult engineering centres	H	C	C	C	P	C	P	P	P			P	
AMRC Nuclear Manufacturing Group	H/v		C	P		C	P	P	C	P			
Centre for Process Innovation	H	C	C	P	P	C	P					P	P
Cell and Gene Therapy Catapult	H/v		C	C		C	C					P	P
Medicines Discovery Catapult	H/v	C	C	P							P	P	
Offshore Renewable Energy Catapult	H/v		C	C		P	P	C	C	P		C	P
Compound Semiconductor Applications Catapult	H/v		C	P		P	P	P	P				
Other Catapults (Digital, Places, Energy, Satellite)	H	P	C	C		P		P			P	C	P
TWI and membership-based RTOs	H	C	C	C		P	P		P				
Innovate UK Business Connect and KTP	H	P	C	C							P	P	
British Business Bank (incl. British Patient Capital)	H						P				C	C	C
National Wealth Fund	H			P		P	C			P			P
BSI and UKAS	H			C			P		P				
UK Intellectual Property Office	H										P	P	
Skills system (Skills England, IoTs, FE)	H		P	P		P	P						
Made Smarter Adoption and IUK Business Growth	H/v		P	P		C	C				P	C	C
Devolved administrations and MCAs	H	P	P	P	P	P	C	P	P	P	P	P	C
Place instruments (Investment Zones, Freeports)	H/v	P	P			P	P				P		
Government Commercial Agency and procurement	H	P	P	P				P				P	
SECTORAL · AEROSPACE													
Aerospace Technology Institute and ATI Programme	V	C	C	C	P	P		P			P		
ADS Group (SC21, Aero Excellence)	V						P	P	C	P		P	P
Aerospace primes (Rolls-Royce, Airbus UK, GKN)	V	C	C	C		C	C		C	P			
SECTORAL · AUTOMOTIVE													
Advanced Propulsion Centre and DRIVE35	V	P	C	C	P	C	C	C	P	P	P	P	
UK Battery Industrialisation Centre	V			P		C	P		P				
SMMT Quality Management	V						P	C	C	P			
Automotive primes and cell makers	V		P	P			C		P				
SECTORAL · LIFE SCIENCES													
Office for Life Sciences (LSIMF, LSLIP)	V					P	C						P
NIHR	V	C	C	P								P	
CGT Catapult, MDC and MMIC	V	C	C	C	P	C	C				P	P	P
MHRA, NICE and the NHS as lead customer	V			C			P						C
Life sciences primes (AstraZeneca, GSK)	V	P	P	P		P	P						P

C A defined responsibility · P Done, but alongside other work · No published activity identified

H horizontal · H/v formally horizontal, de facto sectoral · V vertical

SOURCE: AUTHORS' ASSESSMENT, AUGUST 2026. THE COMPLETE RECORD OF EVERY CLASSIFICATION, WITH THE NAMED INSTRUMENT AND SOURCE BEHIND EACH, IS IN ANNEX 1.

FIGURE 9. THE INDUSTRIAL INNOVATION FUNCTIONS OF THE CROSS-SECTOR SYSTEM

HOW TO READ THIS FIGURE

Each row is an institution; each column is one of the eighteen functions used throughout this report. A cell is coded only where a named instrument, programme or statutory duty could be identified.

C — the function is named in the institution's remit, strategy or founding document and a standing instrument delivers it.

P — a named programme delivers it, but the mandate derives from elsewhere, covers one segment, or operates at limited scale.

The two families are set side by side deliberately: the comparison between them is the point of the exhibit.

INSTITUTION		FAMILY A · INNOVATION FUNCTIONS FOR TECHNOLOGY DEVELOPMENT									FAMILY B · FUNCTIONS FOR SECTORAL INDUSTRIAL DEVELOPMENT								
		F1 Proof of concept / application feasibility (TRL 2-3)	F2 Concept validation in lab environment (TRL 4-5)	F3 Prototype demonstration, realistic environment (TRL 6-7)	F4 System demonstration, real-world environment (TRL 8-9)	F5 Standards, regulation, norms and IP	F6 Technology knowledge exchange and networking	F7 Technology intelligence and foresight	F8 Training, skills and education	F9 Access to expertise and facilities	G1 Sector roadmapping and foresight	G2 Market demand articulation and intelligence	G3 Guiding direction of search (sector level)	G4 Supply chain development and qualification	G5 Network development and cluster building	G6 Entrepreneurship and venture building	G7 Scale-up and patient capital provision	G8 Targeted investment attraction and anchoring	G9 Industrial skills and workforce mobilisation
Centre of government (No. 10, Cabinet Office, HM Treasury)	H										P		P				C	P	
Dept for Business, Innovation, Science and Trade (DBIST)	H	C	C	P	P	C		C	C	C	C	P	C	C	P	P	C	C	P
Advisory bodies (NTA, ISAC, Council for S&T)	H							C			P	P	P						
Investment Security Unit (NSI Act 2021)	H					C												P	
UKRI research councils (EPSRC, MRC, BBSRC, NERC, STFC)	H	C	C	P		P	C	P	C	P			P		P	P	P		
Research England	H	C	P			C	C		P	C					C	C			
Innovate UK	H		C	C	P	P	C	P	P	C		P	P	P	C	C	P		
Advanced Research and Invention Agency	H	C	C	P	P	P	C	C	P	P					P	C		P	
Dstl and MOD science and technology	H/v	C	C	C	C	C	C	C		C	C	C	C	C	P	P	P		C
Universities, research institutes and TTOs	H	C	C	P	P	C	C		C	C				P	P	C	P		P
National Physical Laboratory (incl. National Measurement Syst.)	H	C	C	C		C	C	P	P	C				P	P				P
UK Atomic Energy Authority	H/v	C	C	C	C		C	C		C	P	P			C	P	P	P	
Other PSREs (NNL, UKHSA, BGS, Met Office)	H	C	C	C		P	P		P	C	P								
HVM Catapult centres (AMRC, MTC, NCC, WMG, AFRC)	H	C	C	C	C	P	C	P	C	C	P	P	P	P	P			P	P
AMRC Nuclear Manufacturing Group (formerly Nuclear AMRC)	H/v		C	C	P	P	C		P	C		P		C	P		P		
Centre for Process Innovation	H	C	C	C	C		C		P	C	P					P	P	P	P
Cell and Gene Therapy Catapult	H/v		C	C	C	P	C	C	C	C	P	C	P		C	P			P
Medicines Discovery Catapult	H/v	C	C	P			C		P	C			P		P	P	P		
Offshore Renewable Energy Catapult	H/v		C	C	C	P	C	P		C	P	P	P	C	C	C		P	
Compound Semiconductor Applications Catapult	H/v		C	C	P	P	C	P		C	P		P	P				P	
Catapults (Digital, Connected Places, Energy Systems, Satellite)	H			C	C		C	C	P	C	C	P		P		C	P	P	P
Innovate UK Business Connect and KTP	H			P			C		P			P			C	P			
TWI and membership-based RTOs	H	C	C	C	P			P		C	P			P	P				P
Representative bodies (CBI, Make UK)	H						P		P			P			P				P
British Business Bank (incl. British Patient Capital)	H											C	P		P	P	C	P	
National Wealth Fund	H												C	P	P		C		
British Standards Institution and UKAS	H					C	P			C									
UK Intellectual Property Office	H					C		P								P			
Skills system (Skills England, IoTs, FE colleges)	H								C	P	P	P			P				C
Made Smarter Adoption and Innovate UK Business Growth	H					P	C		C						P	C	P		
Devolved administrations and mayoral combined authorities	H	P	P	P					P	P	P	P	C	P	C	C	C	C	C
Place instruments (Investment Zones, Freeports, LIPF)	H	P	P						P	P			C		C	P		C	P
Government Commercial Agency and public procurement	H					C	P		P			P	C	P		P			

C A defined responsibility · P Done, but alongside other work · No published activity identified · *H horizontal* · *H/v formally horizontal, de facto sectoral* · *V vertical*

Individual firms are not coded here: a horizontal matrix cannot meaningfully assess "large firms" in the aggregate. They are coded by name in Figure 10. A blank cell records documentary silence in the sources consulted, not assessed absence.

SOURCE: AUTHORS' ASSESSMENT, AUGUST 2026. THE COMPLETE RECORD OF EVERY CLASSIFICATION, WITH THE NAMED INSTRUMENT AND SOURCE BEHIND EACH, IS IN ANNEX 1.

The difference becomes clearer when the entries are separated by mandate. Almost two-thirds of the innovation activities recorded form part of an institution's defined remit. For industrial development activities, the equivalent share is less than one-third. Much of the remaining work is delivered through programmes that sit alongside another institutional purpose or apply to a particular sector or part of the economy. This asymmetry is notable because industrial development activity is nearly as widespread: the assessment records 145 industrial development entries against 169 innovation entries. The institutional landscape therefore appears to have expanded into industrial development activity faster than formal mandates have evolved around it.

The mapping cannot tell us whether this distinction changes outcomes in practice. An activity delivered at the edge of a mandate may still be highly effective, but it may be less visible to other organisations, more exposed when priorities change, or harder for firms and policymakers to plan around. Testing whether these effects occur would require evidence on institutional behaviour and firm journeys rather than documentary mandates alone.

The distribution across institutions reinforces the point. Twelve organisations have innovation functions as defined responsibilities but no industrial development function at that level, while five show the reverse pattern. Several organisations with extensive technology development roles – including High Value Manufacturing Catapult centres, the National Physical Laboratory, the Centre for Process Innovation, and the research councils – have no industrial development function recorded as a defined responsibility. Conversely, the devolved development agencies, British Business Bank, and National Wealth Fund carry several industrial development responsibilities but none from the innovation set. Fifteen institutions span both families, although most lean clearly to one side.

Four identified institutions hold supply chain development and qualification as a defined responsibility: DBIST, through a Supply Chain Centre established in June 2026; the Ministry of Defence, through its defence supply chain programme; the AMRC's nuclear manufacturing group; and the Offshore Renewable Energy Catapult. Three of the four are sector-confined, and the fourth was 2 months old at the time of assessment.[28]

Defence is a notable contrast. The Defence Science and Technology Laboratory (Dstl) and the former Ministry of Defence science and technology group combine five of the nine industrial development functions as defined responsibilities with a broad set of innovation functions.[29] The sector also operates under conditions that differ from most civil industries: a dominant customer, a published industrial strategy, and a defined supplier base. This does not make defence a model for direct replication, but it shows that a range of functions can be brought together within the UK system under certain sector conditions.

Sectoral analysis of industrial innovation functions

Figure 10 applies the same framework to sector-mandated bodies in aerospace, automotive, and life sciences. These sectors were chosen because previous CIIP work identified them as having relatively mature innovation ecosystems, making them useful for examining how industrial development responsibilities can be organised in practice.[30] The comparison shows substantial variation: the functions can be assigned within UK sector architectures, but no two sectors assign the same combination.

These differences should not be read as alternative institutional designs applied to otherwise equivalent industries. Aerospace, automotive, and life sciences differ in production structure, regulatory

[28] Department for Business and Trade (2026). *Supply Chain Centre: mission statement and action plan.* Eleven of its fourteen published actions are commitments rather than operating instruments.
[29] Ministry of Defence (2025). Defence Industrial Strategy; Defence Science and Technology (2019). Defence Technology Framework.
[30] Cambridge Industrial Innovation Policy (2025). *What makes the UK industrial innovation system different?*

environment, capital intensity, the role of lead customers, and the history of public–private coordination; the cases are therefore used to show how different arrangements have evolved under different sector conditions rather than to rank them:

- In aerospace, formal responsibility is concentrated around technology strategy and supplier coordination. The ATI authors the sector technology strategy, and alignment with its roadmaps is an eligibility condition for the co-funding programme it administers with Innovate UK and the department. This creates a direct, documented link between priority-setting and programme funding.[31] ADS Group, meanwhile, operates SC21 and Aero Excellence, two substantial supplier development and qualification schemes. No aerospace-specific instrument was identified for production capital, tooling capital, or the economic retention of prime manufacturer activity.
- Automotive has the broadest formal coverage of the three sectors, with eight of the nine industrial development functions assigned somewhere in the sector architecture. The APC develops technology roadmaps, translates them into competition scope, supports supply chain activity, and administers programmes that include pilot and first-of-a-kind production. DRIVE35 adds larger-scale capital support, while the Automotive Council provides a forum for government–industry direction.[32] This is the most concentrated allocation of industrial development responsibilities identified in the UK sector cases, although the analysis does not test whether the arrangement produces stronger industrial outcomes.
- Life sciences has a different pattern. It has a dense institutional landscape – two Catapults, a national research institute, a manufacturing innovation centre, an established regulator, a major public customer, and substantial dedicated manufacturing capital – but several strategic and supplier development responsibilities are distributed across organisations. In the sources reviewed, no defined holder was identified for integrated sector roadmapping or supplier development, while several bodies contribute to sector direction alongside other responsibilities.[33] This is evidence of the allocation of formal responsibility, not the effectiveness of the institutions involved.

Prime firms and major industrial users form part of the translation architecture itself. Companies such as Rolls-Royce or Jaguar Land Rover can shape sector direction through investment choices, procurement, and technical requirements; provide systems integration and production knowledge; qualify and develop suppliers; provide routes to first deployment; and sustain specialised skills and facilities. Their role is nevertheless different from a public mandate to coordinate sector development, and global corporate priorities will not necessarily coincide with national industrial objectives. The institutional question is therefore not whether primes can substitute for public or intermediary organisations but how sector-level arrangements connect the capabilities of primes and industrial users to Catapults, technology institutes, supplier programmes, finance, skills, and government strategy in ways that build wider sector capability.

[31] Aerospace Technology Institute (2026). Engineering Growth: the UK aerospace technology strategy. The Institute reports £3.7 billion of facilitated research and development investment across 467 projects since 2013.
[32] Department for Business and Trade (2026). DRIVE35 funding programme, updated 10 August 2026: £4 billion of capital and R&D funding is available to 2035; Advanced Propulsion Centre UK (2024), *Technology roadmaps*, 4th generation.
[33] Onwurah, C. (2024). Life Sciences Council: meetings. Written question UIN 25493, House of Commons, tabled 9 May 2024 and answered 14 May 2024 by Andrew Griffith, Dstl, recording the Life Sciences Council's last meeting as 21 November 2023 and two rescheduled meetings. The Life Sciences Sector Plan (July 2025) commits the council to meet twice yearly.

FIGURE 10. THE INDUSTRIAL INNOVATION FUNCTIONS FOR AEROSPACE, AUTOMOTIVE, AND LIFE SCIENCES

HOW TO READ THIS FIGURE

The columns are identical to Figure 10, so the two exhibits can be read against one another. Figure 9 asks what the horizontal system does; this figure asks what sector-mandated bodies do.

C — the function is named in the body's remit, strategy or founding document and a standing instrument delivers it.

P — a named programme delivers it, but the mandate derives from elsewhere, covers one segment, or operates at limited scale.

Firms are coded individually here, against the test set out in the text: does the firm perform the function for the sector, and is its production anchored in the UK?

INSTITUTION		FAMILY A · INNOVATION FUNCTIONS FOR TECHNOLOGY DEVELOPMENT									FAMILY B · FUNCTIONS FOR SECTORAL INDUSTRIAL DEVELOPMENT								
		F1 Proof of concept / application feasibility (TRL 2-3)	F2 Concept validation in lab environment (TRL 4-5)	F3 Prototype demonstration, realistic environment (TRL 6-7)	F4 System demonstration, real-world environment (TRL 8-9)	F5 Standards, regulation, norms and IP	F6 Technology knowledge exchange and networking	F7 Technology intelligence and foresight	F8 Training, skills and education	F9 Access to expertise and facilities	G1 Sector roadmapping and foresight	G2 Market demand articulation and intelligence	G3 Guiding direction of search (sector level)	G4 Supply chain development and qualification	G5 Network development and cluster building	G6 Entrepreneurship and venture building	G7 Scale-up and patient capital provision	G8 Targeted investment attraction and anchoring	G9 Industrial skills and workforce mobilisation
AEROSPACE																			
Aerospace Growth Partnership	V						C				C		C	C	C		P		P
Aerospace Technology Institute	V					P	C	C			C	P	C	P	P	P			
ATI Programme (ATI with Innovate UK and DBIST)	V	P	C	C						P			C			P			
NATEP	V		P				P							P		P			
ADS Group	H/v					C						P		C	C	P			
Civil Aviation Authority	V					C	P					P							
Ministry of Defence as anchor customer (combat air)	H/v				P								C					P	
Rolls-Royce	V	C	C				P		C	C	P			P					
Airbus UK and GKN Aerospace	V			P	C					P	P			P					
AUTOMOTIVE																			
Automotive Council UK	V							P			C		C	P	P				P
Advanced Propulsion Centre UK	V	P	C	C	C		C	C			C	C	C	C	P	C	C	P	
DRIVE35 (DBIST-held)	V		P	P	P								C	P			C	C	
Faraday Institution	V	C	P					C			P	C							
UK Battery Industrialisation Centre	V				P					C				P					
Vehicle Certification Agency and the ZEV mandate	V					C				P		C							
SMMT (incl. SMMT Quality Management)	V					C			C		P	C		C	C			P	P
Jaguar Land Rover	V	P			C						P		P						
Nissan, AESC and Agratas	V				C									P					P
LIFE SCIENCES																			
Office for Life Sciences	V										P		P		P		C	C	
Life Sciences Council	V					P					P		P						
National Institute for Health and Care Research	V	C	C	C	C			P	C	C		P				P			
Cell and Gene Therapy Catapult	H/v		C	C	C		C	C	C	C	P	C			C				P
Medicines Discovery Catapult	H/v	C	C				C			C					P	P	P		
Medicines Manufacturing Innovation Centre (CPI)	H/v			C	P		P			C	P								
MHRA (incl. NIBSC) and NICE	V					C			P	C		C							
NHS as lead customer	V				C					P		C			C	P		P	
BioIndustry Association	V					C	C					P			C		P	P	P
AstraZeneca and GSK	V	P	P		P				P		P						P	P	

C A defined responsibility · P Done, but alongside other work · No published activity identified · *H horizontal* · *H/v formally horizontal, de facto sectoral* · *V vertical*

CELL AND GENE THERAPY CATAPULT AND MEDICINES DISCOVERY CATAPULT APPEAR IN FIGURE 9 AND FIGURE 10. THIS IS DELIBERATE: THEY ARE FORMALLY HORIZONTAL BODIES THAT CONSTITUTE MUCH OF THE SECTOR'S TRANSLATIONAL CAPACITY. A BLANK CELL RECORDS DOCUMENTARY SILENCE IN THE SOURCES CONSULTED, NOT ASSESSED ABSENCE. SOURCE: AUTHORS' ASSESSMENT, AUGUST 2026. THE COMPLETE RECORD OF EVERY CLASSIFICATION, WITH THE NAMED INSTRUMENT AND SOURCE BEHIND EACH, IS IN ANNEX 1.

2.4 Industrial translation becomes less clearly organised as technologies move towards production and scale

The mapping points to a clear gradient. Formal responsibility is most firmly assigned around research and technology development, while several functions associated with production, supply chains, and industrial scale are more diffusely allocated. Five practical opportunities emerge from the analysis: three concern capabilities for which no defined holder was identified in the institutions and sectors assessed; and the others relate to responsibilities that are split between different organisations or carried mainly through contributory programmes.

The preceding sections described the landscape and assessed what institutions are formally set up to do. This section draws the findings together and considers how far they are consistent with the study's three analytical questions.

Five points where institutional responsibility for industrial translation is least clear

1. **First, defined responsibility becomes less common with distance from research and technology development.** Among active institutions, proof of concept is a defined responsibility for 87%, laboratory validation for 85%, technology knowledge exchange for 82%, and access to expertise and facilities for 78%. The 10 lowest shares range from 19% to 40%, and 9 of those 10 are industrial development functions. The pattern therefore appears as a gradient towards production and industrial development rather than a simple divide between two categories.
2. **Second, no defined holder was identified for three capabilities in the cross-sector or sector-specific assessment.** The first is the early system-level judgement of whether a technology could be manufactured in the UK and whether the necessary industrial base exists. Several institutions contribute relevant expertise, but the material reviewed did not identify one with a standing responsibility for making that judgement. The second is domestic content, supply chain resilience, and rate readiness. Again, several organisations are active, but no defined holder was identified. And the third is the retention of strategically important industrial capability. Investment attraction is comparatively well institutionalised, including through cross-government mechanisms such as the Office for Investment. But no general economic instrument was identified with an explicit mandate to assess whether strategically important production or supply chain capability is at risk of relocation or loss, or to mobilise a response when it is. Outside the national security regime, no sectoral holder was identified in respect of exit in any of the four sectors examined (Table 8). These findings describe formal responsibility in the published record; they do not establish that the underlying activities are absent.

   Consultation evidence illustrates what the third of these gaps looks like in practice. One participant described a process developed in the UK with public innovation support now being scaled in parallel in two other advanced economies, where the later-established sister operations are close to overtaking the UK site. The firm's account located the difference not in the market, which it described as substantial and largely supplied from a single country, or in the technology, but in the availability of capital support for building production capacity. Its investors were said to be weighing where to place that capacity. The same participant was clear that the strategic importance of the capability was well understood within government; what they felt was missing was a decision and the means to act on it. Another participant, describing a

recent visit to a counterpart operation overseas, contrasted the scale of state commitment in blunt terms: “Their R&D plant is a full production plant – it’s not a little lab-scale plant.” These accounts do not establish how widespread the pattern is, but they do describe the situation that the mapping identifies in institutional terms: a capability at risk of relocation, with no body holding a standing responsibility to assess that risk or mobilise a response.

3. **Third, four functions are held by three institutions or fewer.** The functions are sector roadmapping and foresight, market demand articulation and intelligence, targeted investment attraction and anchoring, and industrial skills and workforce mobilisation. Industrial skills is the thinnest of the four on a second measure too: it is the only one of the nine industrial development functions that none of the three sector cases holds as a defined responsibility, with each holding it partially instead. The consultation participants identified the same function as a live constraint. One firm that had built domestic production capacity described having to recruit part of the specialist workforce from overseas and then finding that staff trained at its own expense moved to other industries or abroad, leaving it regenerating the same capability repeatedly while holding headcount flat. Another attributed the thinning of specialist engineering and toolmaking capability to sustained outsourcing. Both framed skills retention, rather than initial skills supply, as the binding issue.
4. **Fourth, responsibility for industrial finance and supplier development lies in different parts of the system.** The institutions with defined responsibility for scale-up and patient capital, and for investment attraction, are cross-sector bodies. Most of the institutions with defined supplier development responsibilities are sector-specific. This separation does not demonstrate a coordination failure, but it raises a practical question about how finance decisions are informed by sector-specific knowledge of production and supply chain needs.
5. **Fifth, the sector-mandated bodies are more active around technology, manufacturing, and supply chain readiness than at the later stages of business and market readiness.** In the sectoral assessment, no defined holder was identified for the first two business/market stages and only one for the third. Firms moving beyond production readiness may therefore rely more on cross-sector finance, procurement, and market institutions. The stakeholder interviews repeatedly highlighted access to substantial first customers and procurement routes as important at this stage.

These three gaps are not primarily gaps in programme provision but gaps in system-level judgement and accountability: who assembles the evidence, who determines which capabilities are required, who mobilises the relevant institutions, and who acts when strategically important capability is missing or at risk. The consultation participants reached the same conclusion without being prompted. One firm, listing the sequence of organisations it had to pass through from early funding to market – research funders, an innovation agency, a translation institution, regulators, assessment bodies, and procurement – observed that government treats this as a set of separate remits while a company experiences it as a single pathway. Its summary was direct: **“Who owns that journey? We don’t know who owns that journey from start to finish.”** This observation is a firm-side statement of the institutional finding above; it also anticipates the first of the accountability questions set out in Section 4.2, asked from the position of a company trying to identify who to approach.

Only one institution in the cross-sector assessment holds no function as a defined responsibility, which suggests the pattern above is not a matter of institutions doing too little. And the two institutions holding the most are both in the governance layer – the Dstl with (former) Ministry of Defence science and technology group and DBIST – rather than in the delivery estate.

How the findings refine the analytical questions

The first analytical question is answered by a more nuanced pattern than a simple distinction between technology development and industrial development. Industrial development activity is not absent: the cross-sector assessment records 145 industrial development entries compared with 169 technology development entries. The difference lies in formal responsibility: just under two-thirds of the technology development activity forms part of a defined remit, compared with a little under a third of the industrial development activity. The evidence therefore points to a gradient in how clearly responsibility is assigned as activity moves away from the laboratory, rather than to a simple divide between a system that develops technologies and one that does not build industries.

The second analytical question points to a more differentiated picture across the functions associated with anchoring industrial capability. The mapping identifies clear investment attraction instruments and several sector-specific supplier development programmes, while cross-sector mechanisms also support the attraction and expansion of strategic investment. Responsibility is less clearly specified when the question shifts from attracting investment to retaining existing industrial capability. No general economic instrument was identified with an explicit mandate to respond when a company, licence, or production line leaves the UK, and no defined responsibility for domestic content was found in the sectors assessed. The evidence therefore separates attraction, which is institutionalised, and retention, which is the third capability for which no defined holder was identified. The study does not establish how these arrangements affect investment or retention outcomes.

The third analytical question is best answered in terms of institutional possibility rather than performance. Across the three sector cases, eight of the nine industrial development functions are assigned as a defined responsibility somewhere, but the combination differs: automotive has eight, aerospace four, and life sciences four. The cases therefore show that these functions can be organised at sector level in several ways within the UK system, and that no single configuration is inherent to the UK institutional model. They do not show that sectors with broader or more concentrated mandates necessarily achieve better industrial outcomes; establishing that relationship requires a different research design.

The sector variation therefore does not remove the need for a common approach to research-to-industry translation. It shows that the organisations involved and the precise allocation of responsibilities will differ by sector, while the underlying requirement remains the same: sector direction must be connected to the technical, industrial, and enabling capabilities required for scale.

Limitations of the analysis

- The assessment records what institutions are mandated and equipped to do; it does not establish that holding these functions produces industrial results. Automotive holds the fullest set of the three sectors and has nonetheless seen significant domestic production leave the UK: car output fell from 1,722,698 units in 2016 to 717,371 in 2025, a decline of 58%.[34] Whether institutional arrangement affects industrial outcome is a question this evidence cannot settle. The interviewees consulted for this study made the same point from the firm side, describing decisions to relocate as driven by access to capital, talent, and subsidised facilities abroad rather than the presence or absence of a domestic institution. The consultation participants also located part of the problem outside the institutional system. One adviser with experience of assessing funding proposals argued that many were insufficiently ambitious and that business

[34] *SMMT, Motor Industry Facts 2026*, p. 9, and SMMT press release, 26 January 2017. The Society of Motor Manufacturers & Traders attributes the 2025 figure to specific shocks rather than long-term decline: a cyber incident at the largest UK automotive employer; new tariffs on transatlantic trade; the consolidation of two commercial vehicle plants into one; and restructuring for the transition to electric vehicles. The arithmetic comparison is the authors'.

cases were often not strong enough to attract private capital, observing that domestic lenders frequently lack the capability to assess propositions of this kind. Another cautioned that institutions providing shared capability cannot be expected to do so without charge. These are explanations that institutional mapping cannot test, and they qualify how far clearer responsibility alone should be expected to change outcomes.

- The assessment maps what each institution is set up to do, not how institutions connect to one another, so it can say little about whether the system operates as a continuous pathway.
- The devolved administrations and combined authorities were assessed as a single group, which means the analysis cannot support conclusions about how evenly capability is distributed across the UK.

3) What other industrial innovation systems do, and what the UK can learn from them

The international cases broaden the comparison by showing that industrial translation can be organised in quite different ways. Some systems concentrate sector direction and industrial development responsibilities in a small number of public bodies, while others rely on a more distributed mix of research organisations, industry associations, finance institutions, and government. Several also create explicit links between the organisations setting direction and those holding technical capability. The value of the comparison lies in these institutional mechanisms and contrasts rather than identifying a single model for the UK to copy.

The question is therefore not which national model the UK should reproduce but what mechanisms other systems use to organise the industrial development functions that are less clearly assigned in the UK. The international work is deliberately selective. Rather than mapping the complete institutional landscape of six countries and the European Union, it examines one established sector in each system to identify concrete arrangements associated with industrial translation and value retention. These are illustrative cases, selected because they offer developed examples of sector organisation. They do not establish that the institutional arrangements identified caused the sectors' success.

The cases cover semiconductors in Taiwan, aerospace in Singapore, electric vehicles in China, advanced manufacturing in Germany, semiconductors in the Netherlands, and commercial space in the United States. The European Union is considered at programme level rather than as a national system. Table 4 provides an overview, while the full case studies are reproduced in Annex 2.

Singaporean aerospace and Chinese electric vehicles provide the closest sectoral parallels to the UK aerospace and automotive cases, although even these comparisons are not like-for-like because the institutional boundaries and evidential conventions differ. The remaining cases are used mainly to illustrate how particular functions can be organised. No international case examines life sciences.

TABLE 4. THE SEVEN INTERNATIONAL CASES, AND WHAT EACH ONE SUPPORTS

System	Sector examined	Institutions assessed	Counterpart in this report
Taiwan	Semiconductors	7	No UK counterpart assessed
Singapore	Aerospace	8	UK aerospace – direct comparison
China	Electric vehicles	8	UK automotive – direct comparison
Germany	Advanced manufacturing	12	Cross-cutting, no specific UK counterpart assessed
Netherlands	Semiconductors	8	No UK counterpart assessed
United States	Commercial space	9	No UK counterpart assessed
European Union	Supranational programmes	4	Not a national system; instruments rather than institutions

SOURCE: CAMBRIDGE INDUSTRIAL INNOVATION POLICY COUNTRY CASE STUDIES (2026), REPRODUCED IN ANNEX 2.

These cases should not be read as templates. Each one has developed through its own political, institutional, and industrial history, and several rely on arrangements the UK does not share. Their value is more practical: they show how particular functions are assigned, funded, and linked in established industrial systems, and they provide concrete mechanisms against which the UK evidence can be considered. The discussion first looks at how the main organisations for industrial translation are constituted and funded, then compares the 7 sector maps using the same 18 functions as the UK

assessment, before drawing out the mechanisms that most directly address the gaps and questions identified in Section 2.

3.1 How comparator systems organise and fund industrial translation

Several of the national cases contain a large, publicly supported applied research organisation with a prominent role in industrial translation. Just as important, the organisation that sets sector direction is often separate from the one that holds technical capability. The relationship between the two is created through commissioning, programme management, shared governance, or funding. The cases also reveal a wider range of institutional and funding arrangements than is visible in the UK examples reviewed.

Table 5 compares the six national cases across the strategy framework, the bodies that set direction, the organisations carrying out industrial translation activity, and their funding. Three recurring features are particularly relevant to the UK.

Large applied research organisations are prominent in several cases. Taiwan's ITRI, founded by the Ministry of Economic Affairs in 1973, employs more than 6,700 staff and had revenue in 2025 of approximately US$1 billion, with more than US$700 million coming from public sources.[35] Germany's Fraunhofer operates on an annual budget of EUR3.6 billion.[36] TNO in the Netherlands combines structural government funding with contract income,[37] while Singapore's A*STAR sits alongside the Economic Development Board, Enterprise Singapore, and JTC as statutory boards within the same ministerial system.[38] The UK distributes comparable applied research functions across the Catapult Network, public sector research establishments, and national laboratories rather than concentrating them in one national institute.

A second pattern concerns the relationship between sector direction and technical capability. Taiwan's Department of Industrial Technology (DoIT) has no laboratories of its own but channels funding through Technology Development Programs worth around US$857 million in 2025 and commissions the ITRI to support planning and strategic thinking on national industries.[39] Germany creates a similar connection but in a different way: its Projekttraeger, which design funding calls and prepare funding decisions, are based inside public research centres; the largest, DLR Projekttraeger, administered programmes including the EUR179 million federal industrial research budget in 2025.[40] In both cases, the body setting the programme direction is institutionally close to technical expertise without having to own laboratories.

The cases also illustrate funding and governance arrangements that are less prominent in the UK examples. Germany's VDMA is a private, membership-funded association that performs roadmapping, demand articulation, and cluster-building functions.[41] The German savings banks operate under a

[35] Cambridge Industrial Innovation Policy (2026) country case studies, reproduced in Annex 2. The figures are from the Taiwan case study, drawing on the *ITRI Annual report 2025* (published in Chinese only), https://www.itri.org.tw/ListStyle.aspx?DisplayStyle=05&SiteID=1&MmmID=1036461244303416432, and on the institute's budget documents laid before the Legislative Yuan.
[36] Fraunhofer-Gesellschaft, About Fraunhofer, https://www.fraunhofer.de/en/about-fraunhofer.html (accessed August 2026). The German case study records 76 institutes and independent research units, more than 30,000 employees and an annual budget of €3.6 billion, of which contract research generates €3.2 billion.
[37] The Netherlands case study recorded a total turnover of approximately €830 million in 2025. TNO's own accounts give turnover of €825.5 million and government funding of €396 million: TNO, *TNO Annual Report 2025*, 2026, pp. 7 and 16, https://publications.tno.nl/publication/34645917/xLK3UyEC/TNO-2025-annual-report.pdf.
[38] Ministry of Trade and Industry Singapore, *Transforming the Singapore economy*, 2024. A*STAR publishes no annual budget: its *Annual Report April 2024–March 2025*, https://www.a-star.edu.sg/about/annualreport, contains no financial statements.
[39] Ministry of Economic Affairs, *Department of Industrial Technology brochure 2025/2026*, https://www.moea.gov.tw/Mns/main/content/wHandEditorFile.ashx?file_id=15048. The Taiwan case study records that non-profit research organisations received 68% of the 2025 budget, industry 31%, and academia 1%.
[40] The figure is recorded in the German case study. The programme is the Industrielle Gemeinschaftsforschung, owned by the Federal Ministry for Economic Affairs and Energy and administered by DLR Projektträger since 2024, https://www.igf-foerderung.de/.
[41] VDMA, About us, https://www.vdma.org/ (accessed August 2026). The German case study records 3,600 predominantly Mittelstand member companies and 35 specialist associations.

statutory territorial principle.[42] Singapore's corporate laboratory scheme provides public co-funding with a commitment that the activity remains in Singapore, including S$75 million for the first phase of the Rolls-Royce laboratory and S$88 million for the second.[43] China's National Power Battery innovation centre uses a "company plus alliance" model, in which vehicle manufacturers hold equity in the platform developing their technology.[44] These mechanisms anchor different things – capability, capital, activity, or user commitment – and should not be treated as interchangeable.

TABLE 5. HOW THE SIX NATIONAL SYSTEMS SET DIRECTION, AND WHICH INSTITUTIONS CARRY THE TRANSLATION WORK – COMPILED FROM THE NATIONAL OVERVIEW OF EACH COUNTRY CASE STUDY – THE EUROPEAN UNION CASE IS NOT INCLUDED BECAUSE IT EXAMINES SUPRANATIONAL PROGRAMMES RATHER THAN A NATIONAL SYSTEM

System	National strategy framework	Who sets direction, and whether it holds technical capability	Principal institutions for industrial translation	How they are funded
Taiwan	National Development Plans since 1953, the latest covering 2025–28; Five Trusted Industry Sectors Promotion Plan 2024–28, delivered through the Technology Development Programs, established in 1979.	The National Development Council sets the national plans. Within the Ministry of Economic Affairs, the Department of Industrial Technology sets sector technology direction and has no laboratories of its own.	The ITRI and more than twenty non-profit research institutes funded through the Technology Development Programs; NARLabs' eight national laboratories; the science parks (*CIIP Taiwan case study, 2026*).	Government programme funding alongside contract research. The Technology Development Programs ran at about US$857 million in 2025, of which 68% went to the non-profit institutes (*DoIT brochure 2025/26*).
Singapore	Research, Innovation and Enterprise 5-year plans since 1991, currently RIE2030; Industry Transformation Maps covering 23 sectors.	National Research Foundation, under the Prime Minister's Office, sets national priorities; the Future Economy Council oversees the sector maps. Neither holds laboratories.	A*STAR and its research institutes; the Economic Development Board, Enterprise Singapore, and the industrial land agency JTC (*MTI Singapore, 2024*).	Statutory boards under ministries, core public funding with industry projects. RIE2030 is a S$37 billion 5-year envelope; A*STAR publishes no annual budget of its own (*NRF Singapore, RIE2030; A*STAR annual report 2024–25*).
China	Five-Year Plans, currently the 15th, 2026–30; Made in China 2025; the Key Area Technology Roadmap.	State Council with NDRC, MIIT, and MOST at the strategic level; direction in practice sits with technically deep state-owned and private firms.	Chinese Academy of Sciences institutes; the national engineering and manufacturing innovation centres; state-owned enterprise R&D centres.	Central budget and project funding; state-owned enterprise budgets; an equity-based company-plus-alliance model in the battery centre. Programme budgets not disclosed (*CIIP China case study, 2026*).
Germany	Hightech Strategy lineage from 2006 to	Two federal ministries, BMWE	Fraunhofer; the Projektträger	Institutional base funding of about a

[42] Deutscher Sparkassen- und Giroverband, Zahlen und Fakten, 2024, http://www.dsgv.de/uploads/Flyer_2025_3013807d14.pdf. The territorial restriction is the Regionalprinzip; lending is further mediated by the Hausbankprinzip.
[43] National Research Foundation Singapore, Joint news release: Rolls-Royce and NTU extend their research partnership with new SGD88 million investment, 2019, https://go.gov.sg/corp-lab-rr-ntu; and NRF Singapore, Corporate Laboratories, https://www.nrf.gov.sg/programmes/corp-labs/, which sets out the condition that the research is anchored in Singapore.
[44] Cambridge Industrial Innovation Policy (2026) country case studies, reproduced in Annex 2. The arrangement is described in the China case study as a company-plus-alliance model.

	the Hightech Agenda of 2025; National Industrial Strategy 2030.	and BMFTR, coordinating with the 16 Länder. On the industry side, VDMA performs roadmapping and demand articulation.	agencies based inside public research centres; the Steinbeis transfer network (*CIIP Germany case study, 2026*).	third, with the remainder won competitively from public programmes and from industry. Fraunhofer's business volume was EUR3.6 billion in 2025, with EUR966 million from industry (*Fraunhofer, About Fraunhofer, 2026*).
Netherlands	Top Sectors from 2011, replaced by Six Priority Growth Markets from January 2026; National Technology Strategy 2024.	Ministry of Economic Affairs with the Ministry of Education. The ministry holds no technology readiness functions of its own.	TNO as principal applied research organisation; Invest-NL as national financing and development institution; regional ecosystems, chiefly Brainport Eindhoven (*CIIP Netherlands case study, 2026*).	Structural government funding combined with contract income. TNO turned over EUR825 million in 2025, with EUR396 million of government funding (*TNO annual report 2025*).
United States	No single national strategy document. Direction runs through legislation and federal programmes: Bayh-Dole 1980, SBIR, Manufacturing USA 2012, the CHIPS and Science Act 2022.	Congress authorises and appropriates; the Office of Science and Technology Policy coordinates through the National Science and Technology Council; mission agencies set direction in their own domains.	The national laboratories and federally funded research and development centres; the Manufacturing USA institutes; NIST; the Manufacturing Extension Partnership centres (*CIIP United States case study, 2026*).	Federal appropriation and procurement. The CHIPS and Science Act provided US$39 billion in manufacturing incentives and US$11 billion for research (*CHIPS and Science Act 2022*).

SOURCE: CAMBRIDGE INDUSTRIAL INNOVATION POLICY COUNTRY CASE STUDIES (2026), REPRODUCED IN ANNEX 2; FUNDING FIGURES AS REPORTED BY THE INSTITUTIONS. THE NATIONAL STRATEGY DOCUMENTS NAMED IN THIS TABLE ARE REFERENCED IN THE CASE STUDIES.

Figure 11 positions institutions according to two simple dimensions: whether funding is predominantly public or private, and whether activity lies closer to basic research or market application. The comparison is not intended to be a performance ranking, but it highlights several differences in how the systems are populated.

In each national case at least one organisation between basic research and market application draws on a mixture of public and private funding: the ITRI in Taiwan, Fraunhofer in Germany, TNO in the Netherlands, Manufacturing USA institutes, China's manufacturing innovation centres, and A*STAR's Advanced Remanufacturing and Technology Centre in Singapore. This is broadly the institutional space that the UK Catapult Network was designed to occupy.[45] The comparison is useful for understanding organisational form, but it does not imply equivalence in scale, mandate, or role within the wider system.

The cases differ more noticeably in the density of privately funded intermediaries. Taiwan, Germany, and China each include industry associations, transfer centres, commercial engineering services, or science park operators between public research organisations and firms. Singapore and the

[45] Department for Business, Energy and Industrial Strategy, *Catapult Network Review 2021: how the UK's Catapults can strengthen research and development capacity*, p. 22, https://assets.publishing.service.gov.uk/media/6065a7a9d3bf7f0c8d06b811/catapult-network-review-april-2021.pdf; *High Value Manufacturing Catapult, Annual Review 2022–23*, 2023, p. 36, https://hvm.catapult.org.uk/wp-content/uploads/2023/12/HVMCatapult_Annual_Review_22_23-1.pdf. The House of Lords Science and Technology Committee reported in 2021 that the thirds model was widely regarded as appropriate in principle but not achievable by every Catapult; the High Value Manufacturing Catapult comes the closest to it. Its 2023–24 annual review publishes no income breakdown.

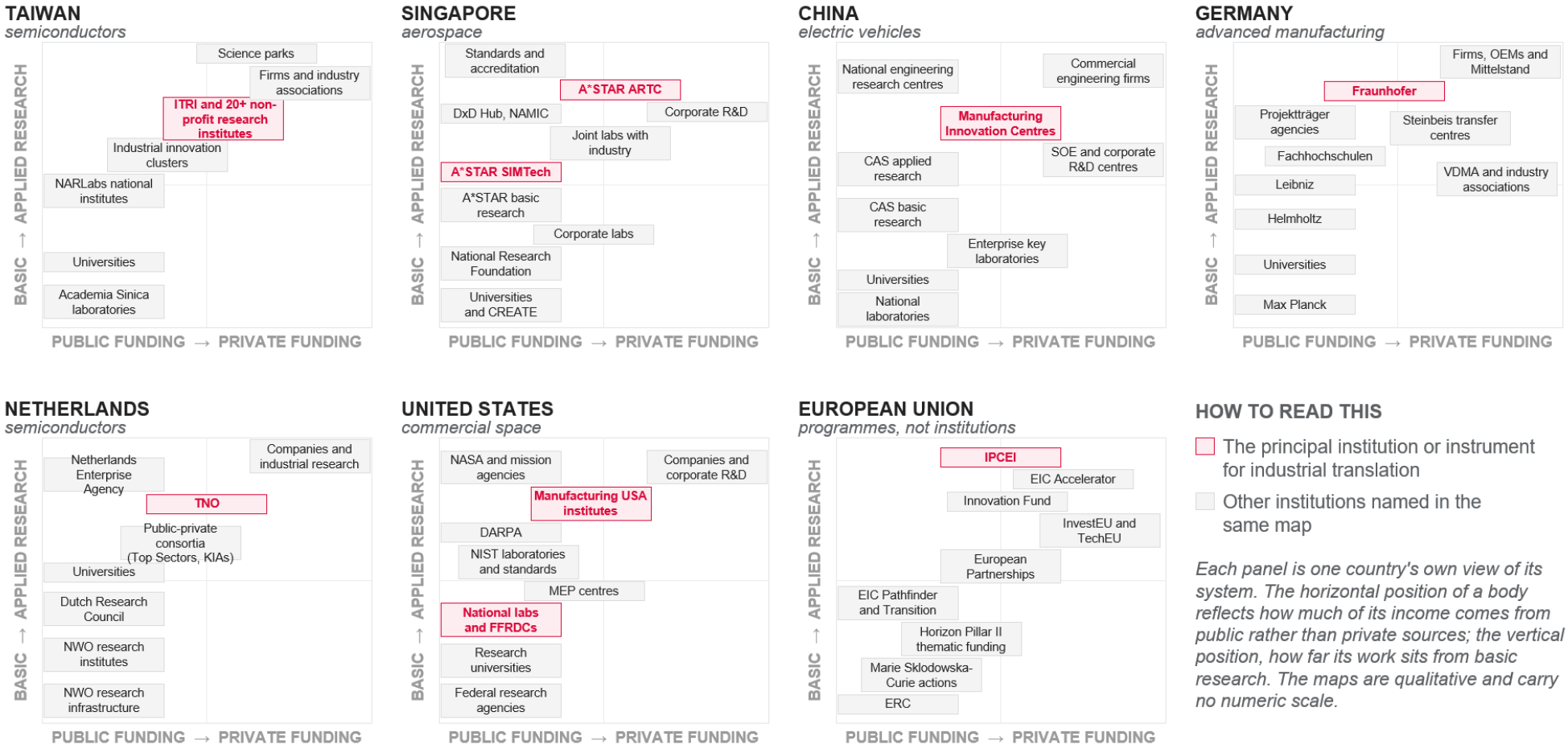
Netherlands place more of this activity within public agencies. Both arrangements coexist with strong industrial sectors, suggesting the balance between public and private provision can vary considerably.

The applied end of the maps also includes organisations that do little or no research. The Netherlands Enterprise Agency, Singapore's standards and accreditation bodies, and Taiwan's science parks are positioned close to market because of the functions they perform, not because they hold deep technical capability. The figure therefore reinforces a broader point: industrial translation depends on more than research organisations.

The European Union is a clear example of this separation: its panel contains financing and programme instruments such as InvestEU, TechEU, the EIC Accelerator, and IPCEI but no supranational technical institute. The Heitor report has recommended that an Industrial Competitiveness and Technology Council strengthen strategic direction at this level.[46] The case illustrates what happens when finance and programme coordination sit at one level while much of the technical capability remains elsewhere.

[46] European Commission, Directorate-General for Research and Innovation, *Align, Act, Accelerate: Research, technology and innovation to boost European competitiveness*, 2024, the report of the independent High-Level Expert Group chaired by M. Heitor.

FIGURE 11. WHERE EACH SYSTEM PLACES ITS INSTITUTIONS ON FUNDING SOURCE AND RESEARCH TYPE; THE PRINCIPAL BODY DOING INDUSTRIAL TRANSLATION IS HIGHLIGHTED IN EACH PANEL



SOURCE: CAMBRIDGE INDUSTRIAL INNOVATION POLICY COUNTRY CASE STUDIES (2026), REPRODUCED IN ANNEX 2.

3.2 Mapping the same functions across seven comparator cases

The 7 international sector maps use the same 18 functions as the UK assessment, but they should not be read as direct scores. The international cases include national institutions that serve the sector, whereas the UK sector map contains only organisations with an explicit sector mandate; the UK's cross-sector institutions are shown separately in Figure 9. This difference in institutional boundaries matters, particularly on the innovation side of the framework.

The common functional framework still allows useful comparison. Nine functions concern technology development, from proof of concept through to standards, skills, and access to facilities. The other nine concern sectoral industrial development, including roadmapping, demand articulation, supply chain qualification, cluster-building, patient capital, investment anchoring, and industrial skills.

In the international cases, the sector map generally includes the national research base, economic ministries, applied research institutes, and enterprise or investment agencies that serve the sector. Taiwan's semiconductor map, for example, includes Academia Sinica and the science parks; Germany's advanced manufacturing map includes federal ministries, Max Planck, and the Sparkassen; and the Netherlands' semiconductor map includes the Dutch Research Council and the Ministry of Economic Affairs. The UK sector map is narrower by design because cross-sector bodies are assessed separately.

For that reason, the fairest comparison on innovation functions is the international map against Figures 9 and 10 taken together. The difference in scope is less consequential for industrial development functions such as demand articulation, supplier qualification, investment anchoring, and industrial skills, which are more likely to sit in sector-facing organisations in both sets of cases. Even so, the counts should be interpreted descriptively rather than as a league table.

This difference in system boundaries is informative. In several comparator cases, the national applied research organisation appears directly within the sector map; in the UK similar capability is more often organised through cross-sector institutions, which may affect how sector direction and technical capability are connected, but the mapping alone does not show whether one arrangement performs better. Figures 12 and 13 present the 7 sector maps on the same 18 columns used in Figure 10. They are the case authors' assessments, based on the literature reviewed.

FIGURE 12. HOW THREE ASIAN SYSTEMS ORGANISE THE SAME 18 FUNCTIONS: SEMICONDUCTORS IN TAIWAN, AEROSPACE IN SINGAPORE, ELECTRIC VEHICLES IN CHINA

INSTITUTION	FAMILY A FUNCTIONS FOR TECHNOLOGY DEVELOPMENT									FAMILY B FUNCTIONS FOR SECTORAL INDUSTRIAL DEVELOPMENT								
	F1 Proof of concept (TRL 2-3)	F2 Lab validation (TRL 4-5)	F3 Prototype demonstration (TRL 6-7)	F4 System demonstration (TRL 8-9)	F5 Standards, regulation and IP	F6 Knowledge exchange	F7 Technology intelligence	F8 Training and skills	F9 Expertise and facilities	G1 Sector roadmapping	G2 Demand articulation	G3 Direction of search	G4 Supply chain qualification	G5 Cluster building	G6 Venture building	G7 Patient capital	G8 Investment anchoring	G9 Industrial skills
TAIWAN · SEMICONDUCTORS (7 institutions)																		
Department of Industrial Technology (DoIT)						C	C		P	C	C	C	C	C	C	P	C	P
Industrial Technology Research Institute (ITRI)	P	C	C	P	P	P	C	C	C	C	C	C	P	C	C	C	P	P
Science Parks					P			C	C				P	C	C			
Taiwan Semiconductor Research Institute (TSRI)	P	C	C	P	P	C		C	C									P
Academia Sinica	P								P									
Universities	P	P	P		P	P		P	P									
Industry	P	C	C	C	P		P	P	C								P	C
SINGAPORE · AEROSPACE · direct counterpart to UK aerospace (8 institutions)																		
Universities, institutes for higher education	C	P			P	P	P	C	P	P	P	P	P	P	P	P	P	C
University-industry Corp Labs	C	C			P	P	P	C	P	P	P	P	P	P	P	P	P	P
A*STAR & its research institutes	P	C	C	P	P	C	P	P	C	P	P	P	C	C	P	P	P	C
National translational platforms/research infrastr.	P	P	C	P	P	C	P	P	C	P	P	P	P	C	C	P	P	P
Lead firms	P	P	C	C	P	C	C	C	C	C	C	C	C	C	P	P	C	C
Industry associations			P	P	P	C	P	P	P	P	P	P	P	C	P		P	P
Regulation authorities		P	P	C	C	P	P	P	P	C	P	C	C	P			P	P
Other government agencies (EDB, ESG)				P	C	C	C	C	P	C	C	C	C	C	C	C	C	C
CHINA · ELECTRIC VEHICLES · direct counterpart to UK automotive (8 institutions)																		
Universities, higher education institutes	C	P	P			P	P	C	P	P		P			P			P
University-based key laboratories	C	C	P	P	P	P	P	C	P	P		P	P	P	P			P
Chinese Academy of Science research institutes	C	C	P	P	P	P	C	C	C	P	P	P	P	P	P	P	P	C
National engineering (tech) research centres/labs	P	P	C	C	P	P	P	P	C	P	P	P	P	P	P	P	P	C
(Central) State-Owned Enterprise (CSOE/SOE)	P	P	P	C	C	P	C	P	C	C	C	C	P	P	P	P	P	P
National Technology/Mfg. Innovation Center	P	P	C	C	P	C	P	P	C	P	P	P	C	C	P	P	P	P
Incumbent firms (e.g BYD, Geely, CATL)	P	P	C	C	P	P	C	P	P	C	C	C	C	C	P	C	C	P
Industry alliance, professional associations				P	C	C	C	P	P	C	C	C	P	C	P	P	P	P

C A defined responsibility (••• in the source) P Done, but alongside other work (• or ••) Function not mentioned in the source

SOURCE: CAMBRIDGE INDUSTRIAL INNOVATION POLICY COUNTRY CASE STUDIES (2026), REPRODUCED IN ANNEX 2.

FIGURE 13. HOW THREE WESTERN SYSTEMS AND THE EUROPEAN PROGRAMMES ORGANISE THE SAME FUNCTIONS: ADVANCED MANUFACTURING IN GERMANY, SEMICONDUCTORS IN THE NETHERLANDS, COMMERCIAL SPACE IN THE UNITED STATES, AND EU INSTRUMENTS

	FAMILY A FUNCTIONS FOR TECHNOLOGY DEVELOPMENT									FAMILY B FUNCTIONS FOR SECTORAL INDUSTRIAL DEVELOPMENT								
INSTITUTION	F1 Proof of concept (TRL 2-3)	F2 Lab validation (TRL 4-5)	F3 Prototype demonstration (TRL 6-7)	F4 System demonstration (TRL 8-9)	F5 Standards, regulation and IP	F6 Knowledge exchange	F7 Technology intelligence	F8 Training and skills	F9 Expertise and facilities	G1 Sector roadmapping	G2 Demand articulation	G3 Direction of search	G4 Supply chain qualification	G5 Cluster building	G6 Venture building	G7 Patient capital	G8 Investment anchoring	G9 Industrial skills
GERMANY · ADVANCED MANUFACTURING (12 institutions)																		
Federal ministries (BMFTR, BMWE)					P	P	P			P	P	C	P	P	P	P	P	P
Länder programmes						P	P	C		P	P	P	P	C	P	P	P	P
Projektträger	P	P	P			C	C			P		C		P	P			
Universities	C	C	C	P	P	P	P	C	P			P	P	P	P		P	P
Max Planck	P	P				P	P	P	P						P			
Leibniz	P	P	P			P	P	P	P						P			
Helmholtz	P	P	P	P	P	P	P	P	P	P		P		P	P		P	
Fraunhofer	P	C	C	P	P	C	P	C	C	P	P	P	P	P	P		P	P
Industry Associations (VDMA. BDI, etc.)					C	C	C	P	P	C	C	P	P	C	P		P	P
IGF	P	C	P		P	C	P	P	P	P	P	P	P	P				
Industry(OEMs & SMEs)	P	P	C	C	P	P	P	C	P	P	C	P	C	P	P	P	P	C
Sparkassen															P	C	P	
NETHERLANDS · SEMICONDUCTORS (8 institutions)																		
Ministry of Economic Affairs & Climate (EZK)					P		C	C	P	C	C	C	P	C	P	C	P	P
Dutch Research Council/Institutes (NWO & NWO-I)	C	P				C	P	P				P			P			P
Netherlands Enterprise Agency (RVO) & Netherlands Innovation Network (NIN)						C	P	P	P	C	P	P	P	C	C	C	C	
ChipNL Competence Centre						C		P	C				P	C	C			P
Invest-NL											P	P			P	C	P	
TNO	P	C	C	P	P	C	C	P	C	P	P	P	P	P	C	C		P
Brainport Eindhoven regional ecosystem	P	P	P	P	P	C		P	C				C	C	C	P	P	P
Universities (e.g. TU Eindhoven, TU Twente, TU Delft)	C	C	P	P		P	P	C	P									P
US · COMMERCIAL SPACE (9 institutions)																		
NASA	P	P	P	P	P	C	C	P	C	C	C	C	C	P	P	P		P
US Space Force		P	P	P	P	P	P	P	P	C	P	C	P	P	P	P		P
Research Universities	C	C	P			P	P	C	P	P		P		P	P			P
FFRDC & UARCs	P	C	P	P	P	P	C	P	C	P	P	P	P	P				P
Space regulators				P	C	P				P	P	P	P					
Standard bodies					C	P	P	P		P		P	P	P				P
Industry (Primes and SMEs)	P	P	C	C	P	P	P	C	P	P	C	P	C	P	P	C	P	C
Industry associations					P	C	P	P		P	P	P	P	C	P		P	P
Finance & investors						P	P			P	C	P	P	P	C	C	C	
EU · SUPRANATIONAL PROGRAMMES (4 institutions)																		
Horizon EuropePillar II	C	C	C	P	P	C	P	P	P	P	P	P	P	P	P	P		P
EIC	C	C	C	C	P	C	P	P	P	P	C	C	P	P	C	C	P	P
IPCEIs		C	C	C	P	C	P	P	C	P	P	P	C	C	P	P	P	P
EIB - TechEU		P	P	C	P	P	P	P	P	P	P	P	P	P	C	C	C	P

C A defined responsibility (••• in the source) P Done, but alongside other work (• or ••) Function not mentioned in the source

SOURCE: CAMBRIDGE INDUSTRIAL INNOVATION POLICY COUNTRY CASE STUDIES (2026), REPRODUCED IN ANNEX 2.

3.3 What comparator systems show about organising research-to-industry translation networks

Across the cases, formal responsibility for technology development functions is generally well specified. The more substantial variation appears on the industrial development side, particularly in how responsibilities are distributed and how broad the mandate of individual organisations is. Singapore and Taiwan concentrate a large share of these functions in a small number of bodies, while Germany and the United States rely on more distributed arrangements. The international cases therefore suggest that the main difference is not whether a system has a particular organisational type but how industrial development functions are coordinated, governed, and connected across different actors and levers.

Industrial development functions can be organised in both concentrated and distributed ways

When seen at the level of the whole map, the innovation side of the framework looks similar everywhere. Every one of the nine technology development functions is held as a defined responsibility in at least six of the seven international cases, and all nine are held in each of the UK's three sectors and across the UK cross-sector estate. In other words, the innovation functions have owners in every system reviewed.

The industrial development side behaves differently, mainly in terms of how many bodies perform the nine functions and how many of these functions are carried by any single body, as illustrated in Table 6. In Singapore two agencies under a single ministry hold all nine between them. In Taiwan four bodies cover all nine, and the DoIT alone holds seven. In China the incumbent vehicle manufacturers hold seven. Elsewhere, the picture is more dispersed: the largest single holder reaches three in the German case, four in the United States, and five in the Netherlands.

The cases therefore suggest that both concentrated and distributed arrangements of industrial development functions can support competitive sectors. Germany and the United States illustrate more distributed arrangements, while Singapore and Taiwan concentrate a larger share of industrial development functions within a small number of bodies. Similarly, the UK sectoral reviews on automotive, aerospace, and life sciences show variation across this spectrum, from more concentrated to more distributed arrangements.

The distribution of responsibility is therefore best understood as a design choice rather than a simple measure of system quality. More concentrated arrangements may make direction and accountability easier to see; and distributed arrangements may draw on a wider range of specialised organisations. The cases reviewed do not establish that one configuration is superior, but they do help to identify where coordination relationships, standing mandates, and delivery levers are made explicit.

TABLE 6. INTERNATIONAL CASES, COVERAGE OF INDUSTRIAL DEVELOPMENT FUNCTIONS

Map	Industrial development functions coverage	Bodies holding at least one	Largest single holder
Singapore, aerospace	9 of 9	7	Economic Development Board and Enterprise Singapore, 9
Taiwan, semiconductors	9 of 9	4	Department of Industrial Technology, 7
China, electric vehicles	8 of 9	6	Incumbent vehicle manufacturers, 7

Netherlands, semiconductors	8 of 9	6	Ministry of Economic Affairs and Climate, 5
United States, commercial space	9 of 9	5	NASA, 4
Germany, advanced manufacturing	7 of 9	6	VDMA, 3
European Union programmes	7 of 9	3	European Innovation Council, 4
UK automotive	8 of 9	6	Advanced Propulsion Centre UK, 6
UK aerospace	4 of 9	5	Aerospace Growth Partnership, 4
UK life sciences	4 of 9	5	Office for Life Sciences, 2
UK cross-sector estate (Figure 9)	9 of 9	20	Devolved administrations and mayoral combined authorities, 6

SOURCE: CAMBRIDGE INDUSTRIAL INNOVATION POLICY COUNTRY CASE STUDIES (2026), REPRODUCED IN ANNEX 2; AUTHORS' ASSESSMENT FOR THE UK ROWS.

Seen across the cases, the distinction between concentrated and distributed arrangements is less important than the mechanisms that allow distributed capabilities to work together. Industrial translation does not require every function to sit inside one institution, but it does require durable ways of connecting sector direction to technical expertise, industrial users, and the organisations controlling finance, skills, infrastructure, suppliers, and demand. The comparator systems use different combinations of commissioning, programme management, shared governance, funding arrangements, procurement, and user participation to create those links. The potential network effect comes from making complementary capabilities accessible and responsive to a shared industrial objective rather than from the number of institutions in the system or the breadth of any organisation's mandate.

Most sector-leading bodies in the cases reviewed do not operate laboratories themselves

Most bodies leading sectoral development in the cases reviewed operate without laboratories of their own. For example, Taiwan's DoIT, the Singapore Economic Development Board and Enterprise Singapore, the Dutch economic ministry and RVO, Germany's VDMA, the European Innovation Council, and the UK's APC, Aerospace Growth Partnership, ATI, and OLS all rely on technical capability held elsewhere in the system. NASA is an unusual case because it is both a mission agency and the owner of research centres and a major procurement budget.[47] This separation suggests that the UK does not obviously lack a particular organisational type that combines sector leadership functions and technical capability within the same body. The more relevant question is how sector direction is linked to technical capability and other delivery levers across the wider system.

Sector-leading bodies vary in their access to non-R&D delivery levers

The UK's sector-leading bodies are mostly R&D-oriented bodies: they run competitions, publish roadmaps, and commission technology programmes. Much of the industrial work at sector level, including supplier qualification, quality certification, and cluster-building, is carried out by trade associations. For example, ADS runs SC21 across more than 880 aerospace companies;[48] and the Society of Motor Manufacturers & Traders (SMMT) has run automotive supplier quality management since 1995 and holds demand articulation.[49] In

[47] Cambridge Industrial Innovation Policy (2026) country case studies, reproduced in Annex 2. The United States case study records NASA and the Space Force as mission agencies setting requirements, buying at volume and investing.
[48] Aerospace Growth Partnership, SC21: Supply Chains for the 21st Century, https://theagp.aero/sc21/ (accessed August 2026). More than 880 companies have signed up since launch. ADS also delivers Aero Excellence, a common supplier assessment standard developed jointly with GIFAS in France and BDLI in Germany, https://www.adsgroup.org.uk/supply-chain/aero-excellence/.
[49] SMMT Quality Management, About SMMT Quality Management, https://www.smmtqm.co.uk/about/ (accessed August 2026). Established in 1995 through collaboration between the UK government, SMMT, and leading vehicle manufacturers, and host of the UK IATF Oversight Office. Demand articulation is held through SMMT Data Intelligence, https://www.smmt.co.uk/about/.

this respect, the UK resembles Germany, where VDMA performs roadmapping, demand articulation, and cluster-building as a private membership association.[50] Taiwan and Singapore place that work inside a state agency instead, alongside sector direction and the budgetary capacity to act on it. Taiwan's DoIT, for example, plays a role in investment attraction, while Singapore's enterprise and investment agencies combine investment attraction with industrial skills functions. The key difference lies less in the existence of these functions than in how they are combined within institutional mandates.

For industrial development functions, UK sector-level institutions have more clearly articulated responsibilities for sectoral direction than for resource mobilisation, although this varies across the three sectors reviewed:

- **Direction:** roadmapping and direction of search are held as defined responsibilities in aerospace by the Aerospace Growth Partnership, the ATI, and the ATI Programme, and in automotive by the Automotive Council UK and the APC. Demand articulation is held in automotive by the APC, the Faraday Institution, the Vehicle Certification Agency, and the SMMT, and in life sciences by the Cell and Gene Therapy Catapult, MHRA with NICE, and the NHS as lead customer. Life sciences holds neither roadmapping nor direction of search as a defined responsibility, and aerospace holds no demand articulation. Internationally, demand articulation and direction of search are held in all seven cases and roadmapping in six. On direction, the UK is broadly comparable, with life sciences being the exception.

- **Resource mobilisation:** this analysis identified no UK sector institution holding industrial skills and workforce mobilisation as a defined responsibility in any of the three sectors, while five of the seven international cases record a holder. The function is not absent from the UK: it is held in the cross-sector assessment by the skills system, the devolved administrations and mayoral authorities, and the Dstl, and several Catapults perform it alongside other work. Training and skills as a technology function is held within the sectors by the SMMT and by Rolls-Royce. What the evidence does not show is a sector body responsible for mobilising a workforce at industrial scale. Entrepreneurship and venture-building is held only in automotive, by the APC. Scale-up and patient capital is held in automotive and life sciences but not aerospace, and across the cross-sector estate by the British Business Bank, the National Wealth Fund, and others.[51]

Primes and industrial users can provide direction and industrial pull within translation networks

The comparator cases also show that industrial users are not positioned only at the end of the translation process as customers. Singapore's aerospace system draws sector direction from anchor firms while connecting them to public research, investment, skills, and industrial land agencies. In China, incumbent vehicle manufacturers participate directly in the battery innovation platform, including through equity ownership, while Germany uses industry associations to aggregate firms' technological and supplier needs. These arrangements differ substantially, but they share a feature that is relevant to the UK: industrial users shape priorities, production requirements, supplier capability, and routes to industrial deployment.

[50] The German case study records the Industrielle Gemeinschaftsforschung as drawing on 102 pre-authorised industrial research associations, with publication of results a condition of funding. AiF administered the programme from 1954; in 2015 the Federal Audit Office criticised a conflict of interest in AiF simultaneously representing the research associations and deciding on their funding, and the 1996 administration contract proved incompatible with current procurement law, forcing an EU-wide re-tender. DLR Projektträger has been sole administrator since 1 January 2024.
[51] Authors' assessment, August 2026. The complete record of every classification, with the named instrument and source behind each, is in Annex 1.

The two direct comparisons

- **Singapore aerospace compared with UK aerospace:**
  - Both systems read sector direction from their anchor firms. Singapore's case codes its lead firms as holding roadmapping, demand articulation, direction of search, supply chain qualification, cluster-building, investment attraction, and industrial skills. UK primes are recorded as performing several of the same functions alongside their commercial work. For example, Rolls-Royce sponsors the National Aerospace Technology Exploitation Programme and endorses SC21, sits on the Aerospace Growth Partnership, and holds training and access to facilities.[52]
  - A more material difference lies in how the relevant public functions are organised around that sector direction. Singapore places industrial land, investment incentives, enterprise support, and skills within closely related statutory boards under the same ministry. In the UK, aerospace sector direction is linked most directly to research and development funding through the ATI Programme, while land, investment support, and workforce functions sit elsewhere in the public system. The Singapore case study cautions that the wider model is not directly transferable to the UK.[53]

- **Chinese electric vehicles compared with UK automotive:**
  - The Chinese case places supply chain qualification and patient capital with incumbent firms and the state-backed manufacturing innovation centre. Its distinctive instrument is the pilot line. The Institute of Physics built an indigenous cell production line in 1998 "using self-developed technology, self-made equipment and domestic raw materials", while the National Power Battery platform exists to assess "whether new materials, cell designs and system configurations are ready for further industrialisation". Made in China 2025 also sets a domestic content target of over 80% for key components in commercial vehicles, the only numeric content target identified across the seven international cases.[54]
  - UK automotive has the broadest formal coverage of the three UK sector cases and assigns demand articulation functions widely. But the review did not identify a facility whose stated purpose is to make a system-level judgement about whether a technology could be manufactured in the UK, or an instrument addressing domestic content.

What the international comparator cases add

The purpose of the international review is not to rank the UK against other countries, or to infer that a particular institutional arrangement caused industrial success, but to identify mechanisms that speak to the opportunities found in the UK assessment. Table 7 presents the examples as worked mechanisms, together with an indication of the UK issue to which each is relevant and the limits to transferability.

Several comparator cases use ownership, statutory obligations, or long-term institutional control to make particular capabilities, assets, or capital less geographically mobile. For example, Singapore groups research, investment, enterprise, and industrial land agencies under the same ministry; Taiwan funds and commissions the ITRI as a national capability; China's battery platform includes user equity; and Germany's regional savings banks operate under a territorial principle. These mechanisms anchor different things and

[52] Cambridge Industrial Innovation Policy (2026) country case studies, reproduced in Annex 2. The Singapore case study codes its lead firms on its own four-point scale; this report's assessment of UK primes required a named standing instrument, which firms rarely publish. Part of the difference in coding therefore reflects method rather than substance.
[53] Cambridge Industrial Innovation Policy (2026) country case studies, reproduced in Annex 2. The warning appears twice in the Singapore case study, which also records that the country's aerospace base rests on foreign anchor firms.
[54] State Council of the People's Republic of China, Made in China 2025, Guofa [2015] No. 28, 8 May 2015. The pilot-line quotations are from the China case study.

should not be treated as equivalent; and the case studies do not establish that they are more effective than grant conditions.[55]

The mechanisms in Table 7 fall into three broad groups:

1. Some involve changes in mandate rather than the creation of new organisations. Examples include a standing commissioning relationship between a sector body and a technical institute, programme managers located close to technical expertise, or a funded skills plan attached to a sector strategy.
2. Some are instruments that could, in principle, be adopted within existing structures. These include co-funded facilities with location commitments or pilot lines designed to test industrialisation readiness.
3. And some reflect structural features that are much harder to transfer. These include a city-state model in which relevant agencies sit under one ministry, as in Singapore; a long-standing developmental state architecture, as in China; procurement budgets at US scale; or a regional banking system bound by statute to a territory, as in Germany.

Across these groups, five connecting mechanisms recur: commissioning relationships between the body setting direction and the organisations holding technical capability; shared or joint governance; aligned and multi-year funding; procurement and lead demand; and the direct participation of industrial users in programmes and facilities. These are the instruments through which strategic direction reaches the organisations that control capabilities and resources, and they are available to both concentrated and distributed systems.

Read against the UK evidence, the international cases refine rather than confirm the analytical questions. They show that technology development and industrial development responsibilities are organised differently in many systems but that the UK is not unique in distributing the latter across several bodies. They provide limited evidence on the question of retaining capability at the point of exit, because explicit responsibility is thinly specified in most cases. Most clearly, they demonstrate the variety of institutional forms through which sector-level industrial development functions can be organised, without establishing that any one form produces superior industrial outcomes.

TABLE 7. MECHANISMS IDENTIFIED IN THE SEVEN INTERNATIONAL CASES, THE UK OPPORTUNITY EACH SPEAKS TO, AND HOW FAR EACH TRAVELS; ENTRIES RECORD WHAT WAS FOUND IN THE MATERIAL REVIEWED; AN ABSENCE IS A STATEMENT ABOUT THAT MATERIAL, NOT ABOUT THE COUNTRY

Mechanism identified from international comparator cases	What it does	Which opportunity or analytical question it speaks to	Level of transferability
Coupling technical capability to programme decisions (Taiwan, Germany)	Taiwan's Department of Industrial Technology has no laboratories: it sets sector technology direction and commissions the ITRI, which undertakes planning and strategic thinking on national strategic industries and publishes sectoral research on the department's own site. Germany reaches a similar effect by siting the Projektträger, which design funding calls and prepare funding decisions, inside public research centres. (*CIIP*	Opportunity 1 – responsibility falls away with distance from the laboratory. Analytical question 1.	High. Both are mandates and budget lines rather than new institutions.

[55] Cambridge Industrial Innovation Policy (2026) country case studies, reproduced in Annex 2. The four arrangements anchor different things: common ownership of the Singaporean agencies allows a bundled offer rather than anchoring the firm; Taiwan's arrangement anchors capability in an institute that cannot relocate; the Chinese equity model engages the firm's own commercial interest; and the German territorial banking principle anchors capital. No case study evaluates the outcome of any of them.

	Taiwan and Germany case studies, 2026)		
Pilot line designed to test industrialisation readiness (China, Netherlands)	A physical facility whose stated purpose is to establish whether a design can be industrialised. China's National Power Battery platform exists to determine whether new materials, cell designs, and system configurations are ready for industrialisation. The Netherlands is funding a EUR150 million advanced packaging pilot line and a EUR1 billion national photonics manufacturing facility. (*CIIP China case study, 2026; EZK, National Semiconductor Vision 2035, 2026*)	Opportunity 2, first capability – judging whether a technology can be made in the UK.	High, and partly in place: the UK Battery Industrialisation Centre already performs this role in one sector. (*Authors' assessment; see Annex 1*)
A numeric domestic content target (China)	Made in China 2025 sets a target of over 80% domestically produced key components in commercial vehicles – the only numeric content target identified in the seven cases. (*State Council, Made in China 2025, 2015*)	Opportunity 2, second capability – domestic content and supply chain resilience.	Low. Trade and subsidy commitments constrain instruments of this kind, and the report does not propose one.
A sector talent plan with its own budget (Netherlands)	The Microchip Talent Development Plan commits EUR450 million in government money and EUR310 million from regions and industry over 2025–30 to educate 25,000 additional technical professionals, with a further 15,000 planned for 2031–35 at EUR80 million a year. (*Nationaal Versterkingsplan Microchiptalent, 2024; EZK, National Semiconductor Vision 2035, 2026*)	Opportunity 3 – industrial skills and workforce mobilisation, the thinnest of the four.	High. A budgeted plan attached to a sector strategy rather than a new institution.
Industry-set, state-funded collective research with open results (Germany, IGF)	Firms in a sector define their own research agenda through their associations; the federal government funds it, at EUR179 million in 2025 across 102 research associations. Publication of results is a condition of funding, so the whole supplier base, rather than a named firm, benefits, and every project must state how the result will be transferred to industry and whether it can be implemented. (*CIIP Germany case study, 2026; BMWE, IGF*)	Opportunity 4 – supplier development separated from the bodies that fund it. Also, a project-level version of Opportunity 2's manufacturability judgement.	Moderate. Grant ceilings of EUR275,000 to EUR750,000 make it pre-competitive knowledge for firms without R&D departments, not an industrialisation tool. The German model also had to be rebuilt after a 2015 conflict-of-interest finding and a procurement law challenge. (*Förderrichtlinie Industrielle Gemeinschaftsforschung; CIIP Germany case study, 2026*)
The mission agency as customer and investor (United States)	NASA and the Space Force set requirements, buy at volume, and invest, applying a dual customer-and-investor test to the firms they support, which carries a company past the point where a technology programme would normally stop. (*CIIP United States case study, 2026*)	Opportunity 5 – sector bodies active up to production and much less so beyond it.	Limited at national scale, though the Ministry of Defence performs a comparable role in the UK.
Co-funded corporate laboratories	Public co-funding of industrial research with a location commitment. The Rolls-Royce laboratory at NTU ran at S$75	Analytical question 2 – anchoring supply	High for the instrument itself; the wider Singapore

conditioned on staying (Singapore)	million for its first phase and S$88 million for its second. This illustrates contractual anchoring alongside, rather than instead of, other ownership and governance mechanisms. (*NRF Singapore, 2019; NRF Corporate Laboratories*)	chains, primes, and inward investment.	arrangement is not transferable.
Industrial land as a sector instrument (Singapore)	JTC supplies subsidised, specialised industrial estates and pre-built facilities, including Seletar Aerospace Park – patient capital in physical rather than financial form, and tied to place. (*CIIP Singapore case study, 2026*)	Analytical question 2 – anchoring, and Opportunity 4, where capital and supplier development sit apart.	Moderate. The UK has Freeports and Investment Zones, but they are not attached to sector strategies.
User equity in the industrialisation platform (China)	The National Power Battery innovation centre operates a company-plus-alliance model in which the vehicle manufacturers hold equity in the platform developing their technology. (*CIIP China case study, 2026*)	Analytical question 2 – illustrates one ownership-based mechanism for aligning users with a shared industrialisation platform.	Moderate. The ownership principle is portable even where the Chinese governance is not.

SOURCE: AUTHORS' ASSESSMENT.

How the findings refine the analytical questions

The first analytical question is reinforced by the international evidence, but the comparison also shows there is no single way of organising industrial development responsibilities. Innovation functions are comparatively well specified across all seven cases, while the greater variation lies in how industrial development functions are allocated and combined. Singapore and Taiwan concentrate several of these responsibilities within a relatively small number of organisations, whereas Germany and the United States rely on more distributed arrangements across government, research organisations, industry associations, and finance institutions. The relevant distinction is not just whether industrial development functions sit inside or outside the conventional innovation system but whether the responsibilities required to move towards industrial scale are identifiable and connected to the organisations capable of delivering them.

The second analytical question receives a more qualified answer from the comparator cases. Several systems use mechanisms that can help to connect industrial capability or investment more closely to place, including location-linked co-funding, industrial land, long-term commissioning relationships, statutory territorial obligations, and user participation in shared facilities. These mechanisms anchor different things and operate through different institutional channels, and the cases do not establish any one approach as more effective. Importantly, explicit responsibility for responding when an established company, production capability, or strategic asset is at risk of leaving is not consistently identifiable across the international cases either. The comparison therefore broadens the range of instruments that could support anchoring but does not reveal a single institutional solution to the retention question.

The third analytical question is where the international evidence provides the clearest additional insight. The cases demonstrate that sector direction, technical capability, and wider industrial development functions can be connected through several different institutional arrangements without needing to sit within a single organisation. Taiwan links strategic direction to the ITRI through commissioning; Germany places programme management capability close to applied research expertise; Singapore connects sector-facing agencies with research, investment, enterprise support, skills, and industrial land; and other cases use pilot facilities, supplier development programmes, sector skills plans, procurement, or patient capital to connect strategy to delivery. The relevance of these examples lies in showing that, once a sector-specific need has been identified, there are multiple ways of assigning responsibility and linking the organisations needed to act on it.

4) What this implies for the UK: from institutional coverage to connected industrial translation networks

4.1 From institutional coverage to connected industrial translation networks

Previous CIIP analysis identified an unusually strong university and research base alongside a narrower applied and industrial institutional base. This assessment shows that substantial industrial development activity now exists across a much broader set of UK organisations. The remaining challenge is therefore not simply an empty institutional space: responsibility becomes less clearly assigned as technologies move towards production and scale, while the capabilities needed for industrial translation are not consistently organised around sector-level industrial objectives.

The policy opportunity is to make more deliberate use of the existing institutional base, connecting research and translation institutions to industrial firms, suppliers, finance, skills, infrastructure, investment, and demand through sector-level arrangements capable of turning technological opportunity into industrial capability. This shifts the attention from the design of individual organisations towards the relationships through which distributed capabilities can be mobilised around a shared objective.

A sector-level industrial translation network in this sense has five defining features: a common view of the opportunity and the value the UK is seeking to capture; clearly allocated responsibilities across the organisations involved; durable relationships between translation institutions and industrial users; aligned programmes, funding, and performance measures; and an accountable mechanism for identifying capability gaps and mobilising a response.

This conclusion follows directly from the value-capture argument developed in Section 1. Scientific and technological strength creates opportunities for economic value but does not determine where that value will be realised. Manufacturing capability, specialised suppliers, skills, finance, infrastructure, and routes to market are complementary assets that help to determine whether an innovation can be industrialised in the UK and how much of the resulting value becomes embedded in the domestic economy. The connections between those capabilities matter too: having relevant organisations somewhere in the system is not enough if firms, technologies, and investment cannot draw on them when they are required.

The implication is that institutional responsibility should not be treated as an objective in its own right. Its importance lies in making it possible to recognise when strategically important capabilities are missing or eroding, to determine whether collective action is justified, and to mobilise the organisations able to respond. This is particularly relevant where industrialisation depends on complementary investments across firms, suppliers, infrastructure, skills providers, and customers that no single actor has sufficient incentive or capacity to coordinate. Nor does assigning responsibility imply that government should perform these functions. Depending on the sector and the issue, the relevant role may sit with a government department, a sector body, an industry-led organisation, a public–private partnership, an applied research institute, a financial institution, or another part of the existing system.

This report refers to that role as the system convenor for industrial value capture: the body, partnership, or leadership arrangement that is accountable, within a sector, for establishing what the UK is seeking to build, which capabilities this requires, who is responsible for delivering them, and how gaps and risks are escalated. Naming the role does not imply creating an organisation to perform it; in most sectors it should be assigned to an existing arrangement.

Seen in this way, institutional redesign should follow the capability problem rather than preceding it. Adjusting individual mandates may be necessary in certain cases, but isolated changes are unlikely to create the alignment required to turn sector ambition into sustained industrial capability. A more systematic starting point is to establish, sector by sector, the industrial capabilities and value that the UK wants to develop and retain; to identify the production, supplier, workforce, infrastructure, finance, and market requirements associated with that ambition; and to determine how existing institutions, industrial firms, resources, and relationships need to be organised around it.

What the evidence says about the three analytical questions

The first analytical question asked whether the UK institutional system is configured more clearly for technology development than for sectoral industrial development. The evidence supports this distinction, but in a more nuanced form than a simple absence of downstream activity. Industrial development activity is extensive: the cross-sector assessment records 145 industrial development entries compared with 169 technology development entries. The more significant difference lies in formal responsibility: just under two-thirds of technology development activity forms part of a defined institutional remit, compared with less than one-third of industrial development activity. The institutional landscape therefore appears to have expanded well beyond research and technology development, while formal responsibilities have not evolved to the same extent as activity has moved towards production and industrial scale.

The second analytical question examined how clearly responsibility is allocated across the functions involved in anchoring industrial capability in the UK. The evidence shows a differentiated rather than absent institutional picture. Investment attraction has identifiable mechanisms, including cross-government activity through the Office for Investment, while several sectors have established supplier development instruments. National security powers can also be used in certain circumstances to protect strategically important capability. But responsibility is less clearly specified when it comes to maintaining domestic production and supply chain capability over time, and for responding when economically important capability is at risk of relocation or loss outside those regimes. The evidence therefore points to unevenly allocated responsibilities across the different elements of anchoring rather than to a single missing institution.

The third analytical question asked what can be learned from sectors where sector-level strategic direction and industrial development responsibilities are more explicitly organised. The UK cases show that these functions can already be combined in different ways within the domestic institutional landscape: automotive has the broadest formal coverage among the three civil sectors examined, aerospace combines particularly clear technology direction with supplier development arrangements, and life sciences relies on a denser but more distributed architecture. Defence provides a further configuration under markedly different sector conditions. The international cases extend the range of arrangements observed, from relatively concentrated systems in Singapore and Taiwan to more distributed arrangements in Germany and the United States. None of these configurations can be treated as a model whose effectiveness has been established by this study. Their contribution is to demonstrate that sector direction can be connected to technical capability, finance, skills, suppliers, investment, and other delivery levers through several different institutional arrangements.

Across the three analytical questions, a common institutional requirement emerges despite sector differences. Each strategically important sector needs a clear view of the industrial capabilities required to turn technological priorities into production and retained value, an identifiable source of strategic direction, and durable routes through which existing research institutions, translation organisations, primes, suppliers, finance, skills, investment, and demand-side actors can be mobilised. Sector-specific diagnosis remains necessary to determine which capabilities matter and which organisations should participate, but it should inform the configuration of the translation network rather than acting as a substitute for a common approach to organising translation.

Limits on what the evidence establishes

The study maps institutional mandates rather than the quality of the relationships between institutions in practice. Connectedness is an important part of the value-capture framework developed in Section 1, but this assessment cannot establish whether firms experience the system as a coherent pathway or face discontinuities as responsibility passes between research, demonstration, industrialisation, finance, procurement, and markets. Greater strategic clarity may create the conditions for stronger coherence, but operational coherence has not been measured in this study.

Formal responsibility should also not be confused with industrial performance. Automotive has the broadest set of industrial development responsibilities among the three civil sectors examined and has nevertheless experienced a substantial decline in domestic vehicle production. Energy costs, market access, infrastructure, trade conditions, technology transitions, and decisions taken by multinational firms can all be decisive. The institutional analysis therefore supports a narrower proposition: where strategic objectives and institutional responsibilities are unclear, there is less certainty about who should recognise an emerging capability problem, mobilise a response, and answer for the outcome.

Finally, documentary silence remains different from evidence of absence. A blank in the assessment means that no published instrument or defined responsibility was identified in the material reviewed. Activities may occur informally, through relationships not visible in published mandates, or through programmes that fall outside the material examined.

Defence provides a useful domestic contrast

Defence remains useful because it demonstrates that the UK institutional system is capable of combining strategic direction with a broad range of technology and industrial development functions under certain conditions. The Dstl and former Ministry of Defence science and technology group together cover eight of the nine innovation functions, as well as sector roadmapping, demand articulation, direction of search, supplier development, and industrial skills. The sector also operates with a dominant public customer, a published industrial strategy, a defined supplier base, and substantial technical capability in public ownership.

The relevance of defence is therefore not that civil sectors should replicate its architecture, since its institutional configuration depends on circumstances that most commercial sectors do not share. The more useful lesson is that broad strategic direction and industrial development responsibility are not inherently incompatible with the UK institutional model. Where government and industry have a clear view of the capability they are seeking to create, responsibility and delivery mechanisms can be organised around it.

4.2 Implications and options: connecting sector ambition to industrial capability and retained value

The recommendations translate the evidence into five practical actions for organising existing institutions and industrial actors more deliberately around research-to-industry translation. The assessment does not provide a basis for copying a particular foreign instrument in response to a particular UK gap; instead, the comparator cases show a range of mechanisms through which direction, technical capability, and delivery can be connected. The recommendations therefore focus on the capabilities that sectors need to build, the evidence required to identify gaps, and the relationships needed to mobilise the organisations able to respond.

Recommendation 1: Give each Industrial Strategy sector clear accountability for identifying the production, supplier, skills, infrastructure, finance, and market capabilities needed to turn priority technologies into industrial scale and retain value in the UK

Each sector covered by the Industrial Strategy should have an identifiable arrangement for translating sector ambition into the industrial capabilities required for delivery. This does not necessarily mean creating a new sector institution or designating the same type of organisation in every industry; existing sector councils, government sector teams, sector-specific institutions, or other recognised leadership arrangements may provide the appropriate basis. What matters is that the responsible arrangement maintains a continuing view of the sector's technological, industrial, and market position, identifies emerging capability requirements, and translates those requirements into shared priorities for government, industry, and the institutions responsible for delivery.

This report refers to that arrangement as the sector's system convenor for industrial value capture. Where no suitable arrangement exists, an existing institution should be repurposed or strengthened before a new one is considered. In practice, this function sits most naturally with the government department responsible for sector policy, working through shared objectives and stronger collaboration with the relevant sector teams in DBIST, Innovate UK, and UKRI. The arrangement should align with the Industrial Strategy, define what success means for the sector, and monitor the UK's position relative to international competitors.

The institutional findings can be translated into four practical accountability questions:

1. What opportunities should the UK pursue in this sector, and what value should it seek to capture? *Which organisation or arrangement determines what innovation and industrial capabilities the sector should develop and build?*
2. Can the production capability required to deliver those ambitions realistically be developed in the UK? *Who is responsible for assessing whether it can?*
3. What supplier base and other shared capabilities are required to support it, and do they exist in the UK? *Who is responsible for developing them?*
4. Which industrial capabilities are strategically important to retain in the UK, and are any at risk? *Who is responsible for attracting, expanding, and retaining them?*

The first element of each pair is the substantive question the sector must be able to answer, and the second is the accountability question of who answers it. Table 8 applies the accountability element to the sectors assessed. These questions are not intended as a new analytical framework. They provide a policy-facing summary of the 18 functions and 4 development journeys examined in the study, focusing on areas where responsibility is less consistently assigned. They should be answered explicitly for each Industrial Strategy sector and revisited as sector conditions evolve.

Table 8 shows that the sectors examined currently answer these questions to different degrees. Strategic direction and supplier development are relatively well specified in aerospace and automotive, while no defined holder for the system-level manufacturability judgement was identified in any of the sectors assessed. Investment attraction is more clearly organised than the longer-term retention of industrial capability. Life sciences clearly demonstrates that institutional density does not necessarily translate into a single identifiable point of sector-level responsibility.

The purpose of answering these questions is not to concentrate every function within a single organisation. A sector lead without the ability to draw on the rest of the system would risk becoming another layer of coordination. Strategic accountability therefore needs to be accompanied by durable relationships with the organisations that hold the technical, financial, workforce, procurement, investment, and supplier development capabilities required for delivery.

FIGURE 14. FOUR QUESTIONS OF ACCOUNTABILITY, POSITIONED ON THE TRANSLATION JOURNEY; THE INNOVATION FUNCTIONS ARE ASSIGNED ACROSS THE SYSTEM; THE QUESTIONS THAT REMAIN OPEN CONCERN INDUSTRIAL DEVELOPMENT

INNOVATION FUNCTIONS — ALREADY ASSIGNED ACROSS THE SYSTEM

All nine held as a defined responsibility in the cross-sector estate and in each of the three sectors examined. The four most firmly held functions in the whole assessment are innovation functions: proof of concept 87 per cent, laboratory validation 85, knowledge exchange 82, access to expertise and facilities 78.

RESEARCH AND PROOF OF CONCEPT	VALIDATION AND DEMONSTRATION	MANUFACTURE	SUPPLY CHAIN	MARKET, SCALE AND OWNERSHIP

TECHNOLOGY MATURES → → AN INDUSTRY IS BUILT

1. Which body determines what the sector should build?

Sector roadmapping and direction of search. Held as a defined responsibility in aerospace and automotive. No defined holder in life sciences.

2. Which body can judge whether it can be manufactured here?

Manufacturing readiness, first band. Twelve institutions act. None holds it as a defined responsibility, in any sector assessed.

3. Which body develops the suppliers required to build it?

Supply chain development and qualification. Held in aerospace and automotive, largely by the trade associations. None identified in life sciences.

4. Which body anchors the capability, and acts when it leaves?

Targeted investment attraction and anchoring. Held at the point of attraction in two sectors. No holder identified in respect of exit.

The eighteen functions assessed in Section 2.3 divide into two families. The innovation family is assigned throughout the system, so no question of accountability remains open there. Nine of the ten least firmly held functions belong to the industrial development family, which is where the four questions sit. Question 2 is drawn from the manufacturing readiness dimension rather than from either family.

SOURCE: AUTHORS' ASSESSMENT, AUGUST 2026.

TABLE 8. THE FOUR QUESTIONS OF ACCOUNTABILITY, APPLIED TO THREE UK SECTORS AND TO DEFENCE; A BLANK ENTRY RECORDS THAT NO PUBLISHED INSTRUMENT WAS IDENTIFIED IN THE SOURCES CONSULTED, AND DOES NOT CONSTITUTE A FINDING OF ABSENCE

Sector	Which body determines what the sector should develop, innovate, or build?	Which body can judge whether it can be manufactured here?	Which body develops the suppliers required to build it?	Which body anchors the capability, and acts when it leaves?
Aerospace	Aerospace Growth Partnership; Aerospace Technology Institute	**No defined holder identified** The ATI industrial productivity roadmap contributes alongside other work.	Aerospace Growth Partnership; ADS Group, through SC21 and Aero Excellence	**No sectoral defined holder identified** in respect of attraction. **No sectoral holder identified** in respect of exit.
Automotive	Automotive Council UK; Advanced Propulsion Centre	**No defined holder identified** APC and DRIVE35 value chain capability studies contribute alongside other work.	Advanced Propulsion Centre; SMMT Quality Management	DRIVE35, in respect of attraction. **No sectoral holder identified** in respect of exit.
Life sciences	**No defined holder identified** Life Sciences Council and Office for Life Sciences among five bodies contributing alongside other work	**No defined holder identified** The advanced therapies skills demand survey contributes alongside other work.	**None identified**	Office for Life Sciences, in respect of attraction. **No sectoral holder identified** in respect of exit.
Defence	Ministry of Defence, through the Defence Technology Framework and Defence Industrial Strategy 2025	**No defined holder identified** The Defence Supplier Capability Development Programme contributes alongside other work.	Ministry of Defence, through the Defence Supplier Capability Development Programme	**No defined holder identified** in respect of attraction; munitions onshoring contributes alongside other work. **No sectoral holder identified** in respect of exit.

NOTE: TABLE 8 SUMMARISES SECTOR-SPECIFIC ARRANGEMENTS. CROSS-SECTOR INVESTMENT ATTRACTION AND INVESTOR SUPPORT FUNCTIONS, INCLUDING THE OFFICE FOR INVESTMENT, APPLY ACROSS SECTORS AND ARE DISCUSSED BELOW.

SOURCE: AUTHORS' ASSESSMENT, AUGUST 2026.

Recommendation 2: Require each Industrial Strategy sector to maintain a living opportunity–capability roadmap identifying whether the capabilities needed for industrial scale exist in the UK, where important gaps are emerging, and which capabilities are at risk of being lost

Clear strategic responsibility requires a sufficiently detailed and continuously updated understanding of what the sector is trying to build. Industrial Strategy Sector Plans should therefore be supported by a regular assessment of the industrial capabilities needed to achieve their objectives, going beyond technology priorities to consider production capability, critical suppliers, workforce requirements, infrastructure, finance, demand, and the location of strategically important assets and activities.

Such an assessment would provide a practical way of applying the value-capture framework developed in Section 1. A technology may be technically mature while production capability, supplier readiness, skills, finance, or market conditions remain much less developed. A sector-level capability assessment

would make these dependencies visible before they become binding constraints and would identify where important capabilities are concentrated overseas or becoming vulnerable to erosion.

The roadmap should be maintained as a living document rather than produced periodically. It should track how technological disruption and changes in the international competitive landscape are reshaping the sector, and it should identify the capabilities and skills the UK will need to remain competitive as these conditions change.

The manufacturability question identified in the institutional mapping should be answered explicitly within this roadmap. Integrating it into existing Industrial Strategy sector planning, rather than running it as a separate exercise, keeps the requirement proportionate. For important emerging technologies, government and industry should be able to establish whether the UK has – or could realistically develop – the production processes, facilities, suppliers, infrastructure, workforce, and economic conditions required for industrialisation. Where significant gaps are identified, the assessment should provide the basis for deciding whether the capability is important enough to justify collective action.

The same approach should apply to supplier capability and industrial skills. The appropriate question is not just whether a supplier development programme or skills institution exists but whether the sector has identified the supplier and workforce capabilities implied by its strategy, whether these capabilities are developing at the required pace, and who is responsible for responding when they aren't.

Recommendation 3: Organise existing research and innovation institutions, industry associations, primes, and delivery bodies into sector-level translation networks so that technological priorities can be connected to production, suppliers, finance, skills, investment, and demand

Government should not begin from the assumption that new translation organisations are required. For each Industrial Strategy sector, the organisation or arrangement providing strategic direction should identify the existing institutions and industrial actors needed to translate sector priorities into industrial capability and establish them as a recognisable delivery network. Depending on the sector, this may include Catapults and other technical institutes, Innovate UK, the British Business Bank and National Wealth Fund, Skills England and other workforce bodies, procurement organisations, the Office for Investment, supplier development bodies, regional and devolved institutions, and primes or major industrial users.

Primes and major industrial users should have an explicit role where they hold capabilities that are important to translation. They can articulate production and technical requirements, provide systems integration knowledge and lead demand, help to identify supplier gaps, participate in shared facilities and industrialisation programmes, and provide routes from demonstration into deployment. Their participation should complement rather than replace public strategic accountability, and arrangements should be designed around wider sector capability rather than the interests of individual firms.

One UK example shows what this can look like in practice. In cell and gene therapy, the translation institution did not confine itself to providing development and manufacturing capability but built the downstream infrastructure required for the technology to reach patients, establishing an accredited network of treatment centres alongside the technical capability itself. Consultation participants familiar with the sector described this as decisive: companies that ran trials through the accredited network found onboarding and adoption materially easier at the commercial stage, and participants attributed several successful UK launches to it. The institution also broadened over time, from early-stage development into manufacturing and then adoption, as the binding constraint moved downstream. One interviewee asked whether other translation institutions are drawing the same lesson and building the

surrounding industrial and market environment as the technology matures, rather than after it. That question is, in effect, this recommendation.

Where relationships currently depend on informal coordination or individual programmes, stronger mechanisms may be needed to make the network durable. Depending on the function and sector, these may include standing commissioning relationships, shared programme governance, agreed delivery responsibilities, joint capability assessments, user participation in facilities, dedicated or aligned budget lines, and mission-oriented procurement. The objective is not to reproduce a foreign institutional model but to ensure that sector leadership can mobilise the relevant technical, industrial, and enabling capabilities while leaving specialist functions in the organisations best placed to provide them.

The international cases illustrate how such relationships can be structured in different settings. Taiwan links sector direction to the ITRI through commissioning; Germany places programme management capability close to technical expertise; Singapore connects research, enterprise support, investment, skills, and industrial infrastructure; and the United States uses mission customers to link technology development with demand. Pilot industrialisation facilities, sector workforce plans, and supplier development programmes should therefore be treated as instruments that can support a translation network once a sector has identified a specific capability requirement rather than recommendations in isolation.

Recommendation 4: Make explicit which industrial capabilities and what UK value major public interventions are expected to create or retain, so support for innovation is more clearly linked to domestic industrial outcomes

Where significant public resources are being used to support the development of industrial capability, government should be clearer about the domestic capabilities and value the intervention is intended to create. The objective should not be to require every publicly supported innovation to be manufactured in the UK or to prevent legitimate acquisition, international investment, or integration into global supply chains. Section 1 shows why ownership and domestic value capture should not be treated as equivalent. The relevant question is whether public support is deepening capabilities that provide continuing value to the UK economy.

Depending on the purpose and scale of the intervention, expected outcomes might include investment in production capability, continuing R&D activity, workforce development, supplier development, infrastructure, or the retention of strategically important capabilities in the UK. Any conditions should be proportionate to the public support provided, compatible with the relevant legal and trade framework, and tailored to the economics of the sector rather than imposed uniformly across firms and technologies. Where such outcomes are specified, performance measures should track them. Reporting against research or programme outputs alone – grants awarded, projects completed, demonstrators delivered – does not show whether the intended industrial capability was created or retained.

The consultation participants made the same argument in their own terms. One firm contrasted the measures currently in use – how many companies receive grants, how many technologies reach clinical trials – with the measures it considered relevant: how many technologies successfully scale, how many companies are creating economic value in the UK, and how many products reach the end users they were developed for. Another participant put the underlying point more generally: what is measured drives what is done. Both were describing the same substitution of activity measures for outcome measures that this recommendation seeks to correct.

The international cases illustrate several ways in which governments link public support to continuing activity or capability, including location-linked co-funding and long-term institutional relationships. The UK also uses different mechanisms for different purposes. The Office for Investment supports the

attraction and expansion of strategic investment, while the National Security and Investment regime allows conditions to be imposed where national security risks arise. The 2025 Oxford Ionics transaction illustrates the latter: the acquisition by IonQ was permitted subject to conditions requiring relevant science, engineering, infrastructure, and manufacturing capability to remain in the UK. These mechanisms operate under different policy and legal rationales and should not be conflated. Their relevance to this report is that they demonstrate the range of ways in which government can make the location and retention of capability an explicit consideration.

A wider economic retention responsibility remains less clearly defined. Rather than immediately creating a new institutional function, government should consider whether the objective of retaining strategically important industrial capability is best incorporated into an existing cross-government role, potentially building on current investment functions, or recognised as a shared responsibility across relevant departments, sector bodies, and public institutions.

Recommendation 5: Track how firms and technologies move from research through to industrialisation and scale, so government can distinguish gaps in institutional responsibility from weak connections, inadequate resources, or wider framework constraints

Greater clarity in formal responsibility will not establish that the system works coherently. One of the main limitations of this study is that it maps what institutions are formally set up to do rather than how firms and technologies experience the hand-offs between them. A subsequent phase of work should therefore trace firms through the innovation-to-industry journey, examining how they move between research support, technical demonstration, industrialisation facilities, suppliers, finance, procurement, and markets.

Combined with regular sector capability assessments, this would allow government to distinguish more clearly between different types of problem. Some may reflect an unassigned responsibility; others may arise because organisations with clear mandates are poorly connected; others may be consequences of insufficient resources, inappropriate instruments, or wider conditions such as energy costs, infrastructure, regulation, or market access. These problems require different responses, and institutional restructuring should not become the default solution.

Where the same barrier recurs across firms, technologies, or sectors, it should be treated as evidence for change rather than an isolated case, and it should inform revisions to institutional mandates, programme design, and funding arrangements. Sector arrangements should consequently be treated as adaptive rather than fixed. As technologies, markets, and industrial structures evolve, government and industry should periodically reassess whether the capabilities identified in the sector strategy remain the right ones, whether responsibility for them remains clear, and whether the relationships between the organisations involved are delivering the intended result.

It should also be easier for firms to use a system organised in this way. One practical test of success is whether UK firms, particularly smaller ones, can reach the facilities, testing capacity, and specialist infrastructure they need to innovate and compete internationally rather than finding these capabilities inaccessible or more readily available abroad.

TABLE 9. HIGH-LEVEL IMPLICATIONS AND OPTIONS FOR CONNECTING RESEARCH AND INNOVATION TO INDUSTRIAL CAPABILITY AND RETAINED VALUE

Recommendation	Why it follows from the evidence	What it would mean in practice
Identify the capabilities each sector needs to turn priority technologies into industrial scale and retain value in the UK	Industrial development activity is widespread, but responsibility is less consistently assigned as technologies move towards production and scale.	Answer and publish the four accountability questions for each Industrial Strategy sector, with a recognised arrangement for maintaining strategic direction and capability intelligence.
Require each Industrial Strategy sector to maintain a living opportunity–capability roadmap	Value capture depends on complementary production, supplier, skills, finance, and market capabilities, while the mapping identifies areas where these are not systematically assessed.	Regularly assess production capability, suppliers, skills, infrastructure, finance, demand, and strategically important capabilities required to deliver each sector strategy.
Build sector-level translation networks linking research institutions, primes, and delivery bodies	The UK has many relevant capabilities, but they are distributed across technical institutions, finance, skills, supplier bodies, government, and industrial firms. Comparator systems show several ways of connecting them to sector direction.	Identify the institutions, primes, and industrial users required to deliver each sector strategy and connect them through standing commissioning, governance, funding, and delivery arrangements.
Link major public support to explicit UK capability and value-capture outcomes	Public support can mature technologies without necessarily deepening the complementary capabilities through which longer-term domestic value is realised.	Make the intended UK capability outcomes of major industrial interventions explicit and use proportionate, sector-specific conditions where justified.
Track firm and technology journeys to identify where the translation system breaks down	The study maps formal mandates but does not establish how well institutions connect or perform in practice.	Trace firms and technologies through the system and periodically review whether responsibilities, relationships, and instruments remain fit for purpose.

SOURCE: AUTHORS' ASSESSMENT, DRAWING ON THE UK INSTITUTIONAL ASSESSMENT AND INTERNATIONAL CASE STUDIES.

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Cambridge Industrial Innovation Policy, 17 Charles Babbage Road, Cambridge, CB3 0FS, United Kingdom

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