



THE CENTRE FOR
LONG-TERM RESILIENCE

CLTR's response to the UK Government's Industrial Strategy consultation (*Invest 2035*)

PREPARED FOR

The Department for Business and Trade, His Majesty's Government

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Context

The Treasury and Department for Business and Trade of His Majesty's Government are leading an industrial strategy refresh entitled “Invest 2035”. As part of this process, they are collecting cross-sectoral responses to an open consultation. These responses will inform the design of the strategy, which aims to outline the economic plan for the United Kingdom over the next 10 years.

The Centre for Long-Term Resilience welcomes the “end of short-termism” outlined by the Chancellor of the Exchequer in her speech on 2024-10-31. We firmly believe that the 10-year vision the Government will seek to provide through this strategy is the appropriate way to foster not only investor confidence and economic growth, but also resilience. Clear plans on such time horizons reduce volatility, variability, and unforeseen situations. They also allow for careful development of the economy and industrial base into one which fundamentally supports the UK's need for a degree of self-reliance.

As an organisation, we are keen to ensure that the UK Government integrates considerations of resilience in its industrial strategy. From domestic pharmaceutical manufacturing capacity, through multi-sourced life sciences supply chains, to a risk-based approach to economic development, we have made a number of recommendations in our response to the Government.

While we have submitted our response through the appropriate channels (i.e. the [designated website](#)), we have also chosen to publish our responses publicly in an effort to be transparent about our organisation's aims as regards the industrial strategy. **We hope to see specific mention of resilience in the industrial strategy**, especially as pertains to the fields of activity discussed below.

For any questions or comments, please contact Dr Paul-Enguerrand Fady, Biosecurity Policy Manager, at paul-enguerrand@longtermresilience.org

Sector Methodology

1. How should the UK government identify the most important subsectors for delivering our objectives?

The Centre for Long-Term Resilience is a non-profit independent think tank primarily concerned with advising the UK Government on biosecurity policy, artificial intelligence (AI) policy, and risk management. Any answers herein will focus on these subsectors, although we recognise the importance of other subsectors to a well-rounded industrial base.

We believe the Government should take three approaches to identify the most important industrial subsectors:

Firstly, the Government should consider which industrial subsectors have the greatest potential to grow and ‘double down’ on existing strengths. This could be done through a refreshed or modified version of the methodology used to produce the previous administration’s “[International comparison of the UK research base](#)” report (2022). Both AI and the life sciences are fast growing fields, with huge projected growth for their various applications. The last (now withdrawn) UK Government bioeconomy strategy entitled “[Growing the Bioeconomy](#)” (2019) forecasted that “the annual turnover of the UK industrial biotechnology and bioenergy sectors” would almost triple between 2013 and 2035. The Government should tap into these trends and capitalise on the global talent pool being developed in these fields to help grow the industrial base, resilience, and economy of the UK.

Secondly, the Government should take into account which subsectors have the best academic research base, for instance by producing a refreshed or modified version of the previous administration’s “[International comparison of the UK research base](#)” report (2022). A strong research base ensures that companies can spin out, scale up, and blossom into productive companies. The UK has world-leading universities, many of which specialise in life sciences research; the Government should make a formal assessment of the country’s comparative research advantage and drive foreign direct investment in these fields through targeted public investment.

Finally, the Government should consider the strategic resilience risk posed by the lack of investment in a subsector. This would complement and underpin the two approaches above. The nation’s industrial strategy should be informed by a risk-based approach which identifies and quantifies vulnerabilities and exposure to threats, with and without investment into specific industrial subsectors. Such an approach would heavily prioritise subsectors such as life sciences (including pharmaceutical manufacturing) and those that will undergo changes due to developments in AI.

2. How should the UK government account for emerging sectors and technologies for which conventional data sources are less appropriate?

The Government should solicit opinions from cross-sectoral stakeholders on those sectors/technologies that it identifies as having strong yet hard-to-quantify potential across a range of outcomes. These outcomes might range from economic growth, improvement in living standards, international trade opportunities, supply chain resilience, or some combination of the above. The UK Government could assess this potential through roundtable discussions with industry, academia, and the third sector (think tanks, charities, learned societies, etc). Expert opinion cannot replace quantitative data entirely, but it can be informative where such data is hard to acquire.

3. *The Centre for Long-Term Resilience did not answer this question.*

Sectors

4. **What are the most important subsectors and technologies that the UK government should focus on and why?**

The life sciences (including pharmaceutical manufacturing) should be the UK's top priority subsector. This is the only subsector which will ensure the country's ability to respond to biological threats regardless of whether they are natural, accidental, or deliberate in origin. This is detailed at length in the ["Biological Security Strategy"](#) (2023), which states that "Our ability to understand, prevent, detect and respond effectively to a spectrum of future biological threats is critically reliant on a strong UK science base [...] and a thriving health and life science sector". The life sciences are also an area of strength for the UK; once again, the Biological Security Strategy makes this clear, stating that "We are a leading nation in developing the means to prevent, detect, and treat newly-emerged diseases". In order for this to continue to be the case, and for the life sciences sector to thrive and grow, the UK Government must safeguard the life sciences sector's supply chains.

EU countries currently rely heavily on foreign supply of critical materials in the pharmaceutical and life sciences sectors. This is outlined in a report by Medicines for Europe and the European Fine Chemicals Group, entitled ["A Strong European API Industry Can Achieve Strategic Autonomy of the EU Health System"](#) (2022). This report states that "the EU relies for 74% on other world regions for the manufacturing of its APIs [active pharmaceutical ingredients]". Though the UK has left the EU, our exposure to foreign supply is likely very similar.

Many active pharmaceutical ingredients are manufactured exclusively in China, leaving a critical single point of failure. As outlined in the report by MundiCare entitled ["Where Do Our Active Pharmaceutical Ingredients Come From? – A World Map Of API Production"](#) (2020), "for 93 APIs required in Europe there are no [manufacturers] in Europe". Almost no active pharmaceutical ingredients are manufactured in the United Kingdom, unlike in, for example, Ireland. Data from the IBISWorld report entitled ["Basic Pharmaceutical Product Manufacturing in the UK - Market Research](#)

[Report](#)” (2024) shows a market size of 2.9 billion GBP in the UK compared to 16.7 billion EUR in Ireland. The UK Government must work to close this gap, and make API manufacturing a much more substantial contributor to our industrial base and our national economic growth.

There is an over-focus on manufacturing novel biologics in the UK; these therapeutics, while higher in value, have even more complex (and fragile) supply chains. The UK Government should focus on securing a resilient life sciences manufacturing base to face future biological threats. This means ensuring resilience and capacity in UK manufacturing of medical countermeasures. This includes: antimicrobials (including antivirals), vaccines, diagnostics, personal protective equipment, and basic health technologies required for all medical interventions, such as tubing, needles, and medical packaging.

This renewed focus on producing “the basics” in the UK should not come at the cost of innovation. Alongside renewed strategic thinking and action on pharmaceuticals and tangible medical countermeasures, the Government should lead a concerted effort to foster a strong and innovative bioeconomy. Biotechnology companies are critical to the future of the UK’s economy and to bringing the next generation of high-skill, well-paid manufacturing jobs to our communities. According to the previous administration’s own “[Advanced Manufacturing Plan](#)” (2024), 75% of life sciences jobs are outside London and the South East. There is real potential for the Government to “level up” regions and nations through investment in the life sciences.

Artificial intelligence will also play a key role in developing the UK’s economy, both as an industrial sector and as a technology relevant to other areas of the economy. As a technology, AI may be key for implementing (for example) intelligent supply chain management with advanced forecasting capabilities based on quantitative data inputs. There are many opportunities for AI to facilitate and augment data processing, across almost all sectors. This technology could act as a force multiplier for British industry and the civil service, and the Government should focus on it for that same reason.

As a sector, there are a growing number of frontier AI firms. The UK should ensure that it has an appropriate regulatory and business environment to allow these firms to start up, scale up, and grow on British soil rather than leaving for jurisdictions with more favourable business environments. AI will also allow for the development of novel technologies like medical diagnostics, and as-yet-undetermined developments mean that the UK needs flexible regulatory frameworks to ensure that innovation isn’t stifled. Simultaneously, this innovation must be responsible and underpinned by good data governance and limits on what private industry can do with public data. The prevention of the misuse of AI, including in cybersecurity and the life sciences, is also of critical importance. The UK Government should focus on this area, with close collaboration between DBT, DSIT, and AISI to ensure that an appropriate balance is struck, including as regards forthcoming AI legislation.

5. What are the UK’s strengths and capabilities in these sub sectors?

In the life sciences, four of the top ten (4/10) universities in the world are located in the UK according to the widely recognised “[QS World University Rankings by Subject: Life Sciences &](#)

[Medicine](#)” (2024). This is a level of academic excellence in the life sciences which far exceeds the UK’s size, and which must be capitalised on.

The UK has historically also been a major producer of pharmaceuticals, with a market capitalisation of over a quarter trillion GBP. However, the value of UK pharmaceutical exports to the EU dropped by 20% between 2018 and 2022 according to [data from Statista](#) (2023), and many companies are now choosing to shutter production and R&D plants in the UK (see: the [Pfizer site at Sandwich](#) and the [GSK site in Ulverston](#)).

The UK also has what is widely recognised as the world’s second most attractive startup ecosystem for biotechnology companies (behind the US), and certainly the most attractive in Europe. This is evidenced in a report by McKinsey entitled “[The UK biotech sector: The path to global leadership](#)” (2021). UK biotechnology companies’ share price increases are larger than the US or Europe’s, and we produce many startups which are subsequently acquired by larger US corporations.

The UK also benefits from having:

- 1) the NHS, a public health system which acts as one of the biggest consolidated purchasers in the world and can therefore jump-start domestic manufacturing with the gradual introduction of a “buy British” mandate—in a manner similar to the Ministry of Defense’s stated aim to “invest a total of over £85bn on equipment and support in the next four years [to] provid[e British] industry with the certainty they need to plan, invest and grow”; and
- 2) a commitment to set up the National Biosurveillance Network (NBN) as part of the “[Biological Security Strategy](#)” (2023). This network will be a world-leading system of human and physical infrastructure aimed at safeguarding our shores from pathogenic threats. The Government should make every effort to ensure that the sourcing of the components and technologies being integrated into the NBN is, to the greatest extent possible, British. The Government has already outlined, in a press release entitled “[UK to create world-first 'early warning system' for pandemics](#)” (2024) that UK company Oxford Nanopore would provide some of the technologies underlying parts of this early warning system, as part of the expansion of NHS England’s Respiratory Metagenomics programme. This is an excellent start, but more British companies must be brought into the development of the NBN, to capitalise and build on the strong yet under-appreciated biotechnology ecosystem in the UK.

On the artificial intelligence front, the UK is the first country in the world to have an AI Safety Institute. The UK leads the world in thinking on (and implementation of) cutting-edge AI systems testing, providing a safe yet encouraging environment for startups to flourish.

6. What are the key enablers and barriers to growth in these sub sectors and how could the UK government address them?

The Centre for Long-Term Resilience sees four main barriers to growth in the life sciences industry:

Firstly, there is a lack of investor experience and confidence in the biotechnology space in the UK. The UK Government's "[National Vision for Engineering Biology](#)" (2023) calls for the development of "a broad, rich engineering biology ecosystem [in the UK] that can safely develop and commercialise the many opportunities to come from the technology and the underlying science". This is severely hampered by the low risk appetite for Series B/C/D funding, with many startups receiving much more attractive offers from funds overseas (in particular the USA) which means that public investment is lost by failing to provide a scaling up environment. This is evidenced in the Tony Blair Institute report entitled "[A New National Purpose: Leading the Biotech Revolution](#)" (2024), which states that "the UK's biotech industry lacks late-stage scale-up capital, with at least two-thirds of the funding raised in the last quarter going to seed or Series A funding". This inability to scale up may explain why the UK, despite having the most biotechnology publications per billion USD of GDP, has the fewest patents per publication—as outlined in a report by McKinsey entitled "[The UK biotech sector: The path to global leadership](#)" (2021). An inability for companies to scale up in the UK fundamentally undermines the life sciences subsector's resilience. One way to address this is for the UK Government to de-risk investment in biotech and life sciences startups, for instance by establishing a Singapore-style "Growth IPO Fund" focusing on later-stage funding for scale-up. As indicated in the "[Biological Security Strategy](#)" (2023), "BEIS launched the Life Sciences Investment Programme (LSIP) – a targeted, sectoral intervention to address the funding gap faced by growth-stage life sciences companies in the UK". This department (BEIS) is now defunct, but more similar schemes should be implemented to enable later-stage startups to scale up.

Secondly, there is a brain drain towards countries with higher wages. Wages have become decoupled from productivity across sectors, and the lack of pay progression in-post within the Civil Service means that the Civil Service suffers from high rates of churn and loss of talent to private industry. As the Institute for Government outline in a comment piece entitled "[Collapsing civil service pay undermines the government's ability to deliver](#)" (2023), total staff turnover in the Civil Service reached a 10-year high of 14% in 2021/2022. Retention is as important as upskilling, and ensuring that Civil Servants who regulate and oversee the development of innovative sectors have extensive experience is key to economic growth, especially in emerging technology sectors. Pay is intimately linked with retention. As the Institute for Government describe in their report entitled "[Whitehall Monitor 2024](#)" (2024), "civil service pay is straightforwardly uncompetitive with the private sector [...] Real-terms cuts have degraded the civil service's ability to attract and retain the best talent. Real-terms pay should rise in years to come to make it more competitive". The UK Government must heed this advice and increase wages across the board in the Civil Service to enable growth in the life sciences and other emerging technology sectors.

Thirdly, there is a lack of opportunities in the UK. Much of our life sciences and pharmaceutical industrial capacity has been offshored or outsourced, largely to China and India. The former is particularly concerning given the UK's combative foreign policy implemented by the previous administration, which is outlined in the House of Commons Library briefing entitled "[UK-China relations: Recent developments](#)" (2024). Supply chains for critical life sciences and pharmaceutical

goods could be disrupted easily in the event of a geopolitical crisis around the status of Taiwan or Hong Kong. Those pharmaceutical manufacturing and R&D sites that do remain in the UK are closing, leaving hundreds (sometimes thousands) of highly skilled scientists looking for work. This creates a glut in the market, which prevents recent graduates from being hired and gaining the experience necessary to maintain a healthy pipeline of skilled life science labourers. The UK government should marshal foreign direct investment into this sector to ensure that life sciences and pharmaceutical workers find the high-quality, well-paid jobs described in the Labour Manifesto. The easiest way to do this is through direct public investment (and public-private co-investment) into manufacturing sites; expanding R&D tax credits & relief for life sciences and pharmaceutical manufacturing; and the creation of state-backed Public-Private Partnerships for domestic life sciences and pharmaceutical manufacturing. Growth in the life sciences is the only way to guarantee the delivery of the Biological Security Strategy's ambitions, specifically the "100 Days Mission: Developing prototype therapeutics and vaccines against priority pathogens and threats, and accelerating innovations in platform technology against a future Disease X". The UK Government must ensure that the infrastructure, both physical and human, is in place to secure this strategic enabler to the Biological Security Strategy.

Finally, there has been a drop in the political attention given to the life sciences sector. As the British Generics Manufacturers' Association points out in its report "[Manifesto for building a resilient UK medicines industry](#)" (2024), in Europe "work has started on almost 40 new or expanded generics pharmaceutical plants, representing up to £4bn in investment and creating thousands of jobs" over the last 6 years. The comparative figure in the UK is almost 0. The previous administration's "[Critical Imports and Supply Chains Strategy](#)" (2024) considers life sciences to be one of the five key growth sectors. Yet while [batteries](#), [semiconductors](#), and [critical minerals](#) all have dedicated sub-strategies, there is no sub-strategy providing a unified vision for the growth of a resilient British life sciences or pharmaceutical sector. This sector, which underpins the UK's biological security, is relatively neglected in light of its importance. The Government should meaningfully engage with the relevant actors, both in industry and the third sector, to ensure that an appropriate amount of time and effort is spent on this key area.

Business Environment

7. What are the most significant barriers to investment? Do they vary across the growth-driving sectors? What evidence can you share to illustrate this?

The Centre for Long-Term Resilience sees three major barriers to investment in the life sciences, which broadly reflect the main cost drivers of this subsector. These are: difficulty securing the required factory capacity; energy costs; and costs from environmental standards. The former two are tractable and the Government should seek to reduce their negative impact on investment

appetite; it is not desirable, however, to reduce costs associated with environmental standards at the expense of those same standards. Each barrier is explored in turn below.

The first barrier, regarding factory capacity, is set out in a report by Reuters Events and Maersk entitled “[A Generational Shift in Sourcing Strategy](#)” (2023). This report provides data showing that the life sciences sector (including pharma), more than any other sector, suffers from “difficulty securing the required factory capacity”. The same report shows that the UK is the 3rd most attractive sourcing, nearshoring, and reshoring location in Europe and the 9th in the world. The lack of capacity is echoed by the “[National Vision for Engineering Biology](#)” (2023), which states that “Two-fifths of respondents highlighted a lack of bioprocessing facilities in the UK below the pharmaceutical grade,” forcing UK companies to “deal with UK infrastructure gaps by accessing facilities overseas, with SMEs going abroad to demonstrate proof-of-concept at pilot scale”. There is therefore a clear path forward for the Government to stimulate life sciences sector growth: engage in public-private partnerships, co-investing in the initial capital outlay required for the building of high-spec factories and facilities.

The second barrier, regarding energy costs, is outlined by Surbhi Gupta, senior industry analyst at Frost & Sullivan, in an article published in *Pharmaceutical Technology* entitled “[‘Right shoring’ API production in Europe](#)” (2023). Gupta points out that “Due to the cessation of Russian gas imports following its invasion of Ukraine, electricity prices increased up to tenfold, and raw material costs rose by 50% to 160% in Q3 2022. The energy-related slowdown in manufacturing will aggravate the ongoing drug shortages in Europe”. Note that in the UK, high-impact shortages of generic drugs have doubled in the last two years (2022–2024) according to an analysis published in the British Generics Manufacturers Association report entitled “[Manifesto for building a resilient UK medicines industry](#)” (2024). The effect of high energy costs in the UK will be a delay of “5-10 years” (according to Gupta) in reshoring pharmaceutical manufacturing, absent significant Government intervention to mitigate these costs for the private sector. This also presents a barrier to innovation, as biomanufacturing and biotechnology startups face large operational costs in the UK vs elsewhere in Europe. High energy costs will likely affect the investment appetite for AI companies too, as the computational requirements for cutting-edge AI systems require extremely high energy consumption.

The third barrier, associated with environmental costs, is one that the Government should embrace rather than seek to remove. The UK is uniquely positioned as having a long-established pharmaceutical manufacturing sector while also being at the forefront of environmental standards in pharmaceutical manufacturing. The British Standards Institute (BSI), in collaboration with the Antimicrobial Resistance Industry Alliance, have created the “[BSI Kitemark™ for Minimized Risk of AMR Certification](#)”. This accreditation standard, which demonstrates that a high level of care has been taken to limit pharmaceutical pollution from manufacturing, is now required as part of the NHS subscription programme for novel antimicrobials. An increasing number of national procurement agencies are now implementing this standard in procuring antibiotics: it is included in the joint guidelines for the Nordic (Danish, Icelandic, and Norwegian) pharmaceutical procurement system, as outlined in the article entitled “[International Standard Against Resistance to Antibiotics Included in Nordic Tendering Procedures](#)” (2024). The UK Government should therefore seek to

exploit this shifting trend by supporting (through direct investment or tax relief) the transition towards a greater proportion of UK pharmaceuticals being manufactured in a similarly environmentally responsible manner.

Business Environment – People and Skills

8. Where you identified barriers in response to Question 7 which relate to people and skills (including issues such as delivery of employment support, careers, and skills provision), what UK government policy solutions could best address these?

The UK life sciences skill base is substantially eroded by low wages. This is highlighted in the UK Government's "[National Vision for Engineering Biology](#)" (2023), which states that "there [is] a shortage of lab technicians in both academia and industry. Reasons given included lack of career support [and] low pay". The same is true for mid- to late-career researchers, about which the same report indicates: "The main issues [mid- to late-career researchers] discussed were low salaries (particularly in academia)".

According to [figures from Glassdoor](#), the average UK life sciences salary is £33,991 per annum (from an analysis of 8,225 salaries); new graduates, who can expect a lower-than-average salary, are therefore presented with jobs paying barely above the (new) national living wage of £25,397 per annum (£12.21 per hour for 40 hours per week). Data from 2021 outlined on the IchorBio web page entitled "[Life Science Salaries: What to Expect in the USA, UK, France and Germany](#)" (2021) indicates that industry salaries in the UK are on the order of 40,000 USD, vs 53,000 USD in Germany and 90,000 USD in the USA. Both of these countries have a similar cost of living to the UK according to data provided by the Numbeo web page entitled "[Cost of Living Index by Country 2024 Mid-Year](#)" (2024). There is therefore little economic incentive for life sciences graduates to remain in the UK. Data from GlobalEconomy shows that the UK's position in the "[Human flight and brain drain - Country rankings](#)" has increased substantially between 2016 (with a score of 1.8/10 index points) to 2023 (2.3/10 index points). Wages need to increase; the mechanisms for ensuring that this happens are beyond the remit of The Centre for Long-Term Resilience.

The drop in political attention for the life sciences sector (identified in an earlier answer) has caused further erosion to the skill base: according to the British Generics Manufacturers Association, "Government figures show that life sciences manufacturing volumes fell by 29% between 2009 and 2021, leading to the loss of 7,000 well-paid jobs," as outlined in their "[Manifesto for building a resilient UK medicines industry](#)" (2024). The 7,000 people filling those jobs will have either left for another country or entered unrelated employment, where they will be undergoing skill erosion. Concretely, the Government needs to stimulate foreign direct investment into the UK's life sciences sector through tax relief, R&D credits, or other mechanisms which would ensure that a) these jobs are not lost in the first place and b) more such jobs are created. This will require the

Government to increase spending, which may be complicated given the macroeconomic context in which it is operating.

9. *The Centre for Long-Term Resilience did not answer this question.*

Business Environment - Innovation

10. *The Centre for Long-Term Resilience did not answer this question.*

11. **What are the barriers to R&D commercialisation that the UK government should be considering?**

UK universities demand too high a share of equity from spinout companies. This has been highlighted in a report entitled the “[USIT Guide](#)” (2024) published by the TenU group of university technology transfer offices. In many cases, universities in the UK take 33% of a spinout company’s equity. The TenU group recommends that this not exceed 25% in the life sciences sector and 10% in the software sector. Some universities, such as the University of Southampton, have dropped their equity demand from spinouts to only 10% across all sectors of activity. The UK government should seriously consider implementing much lower maximum equity demands from spinouts of publicly-funded universities as a matter of policy (if not legislation).

Business Environment - Data

12. **How can the UK government best use data to support the delivery of the Industrial Strategy?**

The Government should use data to guide its assessment of the highest-growth subsectors and their subsequent development in light of investment motivated by the Industrial Strategy’s implementation. This will enable the public to tangibly measure the impact of Government direct investment as well as measures put in place to drive foreign direct investment, making a convincing case for value-for-money. Currently, it is not clear that the public understands the return on investment from the public purse, especially as concerns matters of biological security. Being able to show (quantitatively) that following N years of the Industrial Strategy being published and implemented, there has been a growth of (for example) Y% in manufacturing jobs for critical pharmaceuticals and novel biological drugs would go some way to explaining the contribution of the industrial strategy to pandemic preparedness. The type of data most valuable in public communication is likely to be around jobs and economic growth. These are the key promises that

this new administration has made, and public buy-in for the implementation of the Industrial Strategy can be secured through the publication of transparent data showing its outcomes.

13. What challenges or barriers to sharing or accessing data could the UK government remove to help improve business operations and decision making?

Wherever possible, cross-sectoral data should be captured to highlight co-benefits from investments motivated by the Industrial Strategy. For instance, taking the example provided in Answer 12, it is useful not only to mention the increase in jobs associated with increased pharmaceutical manufacturing, but also the resilience that this builds into the wider UK system. This means capturing and publicising data on the implications for e.g. the efficiency or environmental impact of NHS pharmaceutical supply chains. It may be that departments other than DBT gather this data, such as DHSC in the example above. The Government should work to ensure that there is joined up data sharing between departments to ensure that a full picture of the holistic outcomes of the Industrial Strategy are captured.

The UK Government may also play a key role in increasing supply chain visibility. This issue has been very thoroughly characterised in EY's two publications, "[Pharma supply chains of the future](#)" (2022) and "[Why digital supply chain visibility should be a pharma priority](#)" (2023). The UK Government could mandate that pharmaceutical companies set up a "procurement clearinghouse", as outlined in the former publication, "that balances the supply of raw materials and consumables with the pharma industry's demand for these goods". There have been concerns in other jurisdictions that such data sharing between large pharma companies could amount to a breach of antitrust laws. In light of the fact that data sharing of this kind would help boost UK resilience, the Government should consider whether a special regime might apply in this instance.

The UK Government has a unique opportunity to use the implementation of the National Biosurveillance Network (NBN), a key deliverable of the "[Biological Security Strategy](#)" (2023), to perfect its cross-departmental data sharing. The NBN will be a platform which brings together data from across various areas of Government and sectors of activity, "connecting syndromic, epidemiological and promising environmental surveillance capabilities (wastewater, air)". This will therefore act as an ideal case study for the UK Government to gather, and subsequently share, "lessons learned" regarding data sharing & security that could be replicated in other areas of the Government.

Business Environment - Infrastructure

14. Where you identified barriers in response to Question 7 which relate to planning, infrastructure and transport, what UK government policy solutions could best address these in addition to existing reforms? How can this best support regional growth?

One of the barriers identified by The Centre for Long-Term Resilience in our answer centres on factory capacity—an infrastructure concern. According to the previous administration’s own “[Advanced Manufacturing Plan](#)” (2024), 75% of life sciences jobs are outside London and the South East. The Government should seek to maintain this ratio by further developing opportunities in regions and nations of the UK (other than London and the South East) which already have strong established life sciences industries. This might include the Norwich area, home to the Norwich Research Park composed of the John Innes Centre, Quadram Institute, Salisbury Lab, and the University of East Anglia; Oxfordshire, home to both the Harwell Science and Innovation Campus and the Milton Park Science and Technology Park; or Cheshire, home to the Mereside life science campus at Alderley Park.

Policies which could achieve this include increased direct investment in these research parks to build high-spec manufacturing and R&D facilities; subsidised rail travel for skilled workers between these areas and into the Golden Triangle; and increasing direct rail connections among these areas so that the quickest way to go from one to the other is not through London. Decentralisation and increased affordability could potentially drive regional growth.

15. How can investment into infrastructure support the Industrial Strategy? What can the UK government do to better support this and facilitate co-investment? How does this differ across infrastructure classes?

As pointed out throughout the answers provided by The Centre for Long-Term Resilience, access to factory capacity is a major limitation for new investment by the life sciences sector, as set out in a report by Reuters Events and Maersk entitled “[A Generational Shift in Sourcing Strategy](#)” (2023). As a result, any investment made by the UK Government into factory building would be highly beneficial to attracting new private sector investment. The UK Government should therefore seek to develop public-private partnerships with both established and up-and-coming life sciences companies, whereby public investment is matched 1:1 by private investment. This would ensure that the private sector has “skin in the game” while also providing high levels of confidence that the Government is committed to supporting the development of private industry in this space. This co-investment can only be achieved if there is an established trust between parties. Trust is hard to build, but the Government must dedicate effort and capital (both political and financial) to ensuring that trusted relationships develop with the life sciences sector to drive investment and hence growth.

Business Environment - Energy

16. *The Centre for Long-Term Resilience did not answer this question.*

17. *The Centre for Long-Term Resilience did not answer this question.*

Business Environment - Competition

18. *The Centre for Long-Term Resilience did not answer this question.*

19. *The Centre for Long-Term Resilience did not answer this question.*

Business Environment - Regulation

20. **Do you have suggestions on where regulation can be reformed or introduced to encourage growth and innovation, including addressing any barriers you identified in Question 7?**

As the “[National Vision for Engineering Biology](#)” (2023) sets out, “The UK is at risk of falling behind other nations that have been quicker to adopt pro-innovation regulations for engineering biology applications”. The Centre for Long-Term Resilience sees at least three main ways in which the UK Government can reform regulation in order to encourage growth and innovation in the life sciences. These are: increasing the efficacy of the MHRA; designing intelligent tax regimes and regulatory frameworks for novel technologies; and regularly reviewing regulation in light of information provided by the Department for Science, Innovation and Technology’s Regulatory Innovation Office (RIO).

Firstly, the Government must improve the efficacy of the MHRA. As a key regulator for the safety of the nation, this agency must be resourced adequately; at present, it is not. This is the view of many organisations, including the British Generics Manufacturers Association (BGMA), which has pointed out that “the licensing timetable has doubled from 12–15 months to 24–30 months or longer”. It is also the view of the House of Commons Health and Social Care Committee which, in a report entitled “[Pharmacy \(Third Report of Session 2023–24\)](#)” (2024) stated: “The Government should commission an independent review of the medicines supply chain [which ...] should assess, and suggest ways of improving, [...] the performance and role of the MHRA”. The Committee has said that it agrees with the BGMA that shifting priorities from licensing to clinical trials should not have led to a doubling in delays: “We agree with [the BGMA CEO] when he says that “really the MHRA needs to do both””.

An efficient MHRA will also be key to delivering on the ambitions set out in the “[Biological Security Strategy](#)” (2023), specifically the “100 Days Mission: Developing prototype therapeutics and vaccines against priority pathogens and threats, and accelerating innovations in platform technology against a future Disease X”. Stimulating research and development is only useful if the resulting innovation can then be brought to market and to patients quickly. The rate-limiting step is likely to be regulatory rather than scientific, hence the UK Government should work to remove this bottleneck.

There is only one way for this to happen: increasing headcount through hiring. In the macroeconomic context set out by the Chancellor of the Exchequer in her [Budget speech](#) on 2024-10-30, with departments facing cuts to their operational budgets, this may be a difficult prospect. However, it is key that innovation, growth, and ultimately patient safety not be adversely affected by something as trivial as staff retention at the MHRA. The Government should make every effort to hire and (in particular) retain staff within this agency. Retention would be facilitated by allowing for pay progression in-post within the Civil Service, a costly measure but one which would have benefits across all of Government.

Secondly, there is a key regulatory hurdle pointed out most recently by Lord Willetts in [his contribution to the House of Lords “Science and Technology: Economy” debate](#) of 2024-10-31: tax regimes for novel technologies are often inappropriate. As he stated, “cell and gene therapies are a great British scientific and technological success. However, they are suffering from the very uncertain VAT regime for cell and gene therapies sold to the NHS. HMRC defined these therapies as “work on goods” [...] in some cases, VAT is charged at 20%, which, in turn, affects the NICE calculations of the cost-benefit ratio in these treatments”. This is a specific issue affecting a specific class of novel therapeutics, and should clearly be resolved by, as Lord Willetts suggests, the UK Government applying a zero rate of VAT consistent with other therapeutic products not considered “work on goods”. However, this issue is symptomatic of a wider regulatory failing: that novel technologies are forced to exist within regulatory frameworks for past technologies. In order to encourage growth, innovation, and resilience, The Centre for Long-Term Resilience recommends that the UK Government develop appropriate forward-looking tax and regulatory frameworks for novel technologies like metagenomic-based diagnostics, vaccine platforms, bacteriophage-derived antimicrobials, live biotherapeutic products, and others. There is a wealth of innovation occurring in UK universities, startups, and SMEs; regulatory barriers which arise as a result of a lack of Government preparedness will undermine the flourishing of this innovation. This has already happened in the microbial pesticide world, as outlined in the World Bioprotection Forum’s white paper entitled “[Creating the World’s Best-in-Class Biopesticide/BioProtectant Regulatory System](#)” (2022). The Government must learn from the issues faced in this space to ensure that the full potential of life science technologies across the One Health continuum (i.e. in the animal and human spheres as well as in plants) can be harnessed into tangible beneficial outcomes for the UK.

Finally, the UK Government should make judicious and regular use of the input it will receive from the Department for Science, Innovation and Technology’s Regulatory Innovation Office (RIO). The establishment of the RIO is an exciting opportunity for regular review of regulation to become part of the way the UK Government operates at its core. Frequently taking stock of the bottlenecks thrown up by regulation which is not forward looking and which has not been conceived with technological innovation in mind will help make the transition from bench to market (or bedside) much more rapid. The key limitation is the extent to which this new unit is leveraged. If its advice falls on deaf ears, or it is inadequately resourced to produce this advice, the Government will miss a key opportunity to become world-leading in the regulation of emerging technologies. It is already the case that the world looks to the UK for inspiration on how to approach regulation and safety for emerging technologies such as AI, thanks to the UK’s AI Safety Institute. If the Government

empowers the RIO to make bold recommendations that lead to bold actions, this success can be replicated across the entire sector of emerging technology—including the life sciences.

Business Environment – Crowding in Investment

21. *The Centre for Long-Term Resilience did not answer this question.*

Business Environment – Mobilising Capital

22. **What are the main barriers faced by companies who are seeking finance to scale up in the UK or by investors who are seeking to deploy capital, and do those barriers vary for the growth-driving sectors? How can addressing these barriers enable more global players in the UK?**

As the Tony Blair Institute report entitled “[A New National Purpose: Leading the Biotech Revolution](#)” (2024) states very simply, “When compared internationally, the UK has disproportionately less scale-up finance relative to startup finance”. Conversations that The Centre for Long-Term Resilience has had with experts in the biotechnology sector have indicated that there is a low-risk appetite for Series B/C/D funding, with many startups receiving much more attractive offers from funds overseas (in particular the USA) which means that public investment is lost by failing to provide a scaling up environment. The same Tony Blair Institute report provides data showing that “the UK’s biotech industry lacks late-stage scale-up capital, with at least two-thirds of the funding raised in the last quarter going to seed or Series A funding”.

This question asks how to “enable more global players in the UK”. The Government should consider whether this is a desirable outcome. As the BioIndustry Alliance pointed out in their written evidence statement entitled [VCM0003](#) (2022) to Parliament’s Treasury Committee, “much of this investment [in biotechnology] is coming from overseas sources, predominantly the United States. [... this] means a positive feedback loop is less likely to form, in which UK investors see financial returns and reinvest in the sector. Wealth-creation will occur overseas and the long-term sustainability of the UK ecosystem will be undermined”. The Centre for Long-Term Resilience advocates for a strong and self-sufficient UK life sciences economy which delivers surety of supply and the ability to respond to biological risks through innovation and scale-up manufacturing without overreliance on foreign investors. This is in line with the previous “[Defence and Security Industrial Strategy](#)” (2021), which states that the UK Government will “support our industrial and technology base to work internationally whilst strengthening our protections against economic

security risks and hostile investments in sensitive, defence and dual-use technology and capabilities that could harm national security".

Fostering a healthy financial and investment environment in the life sciences domestically should be the priority, to ensure our ability to mitigate global shocks. The Government can achieve this by helping signatories of the Mansion House Compact achieve their goal "to have 10 of the UK's largest pension funds invest 5% of their assets in private [UK] ventures [...] by 2030", as described by [Lord Tarassenko in the House of Lords debate on 2024-10-31](#), through investment in British life sciences and biotechnology companies. The role of reallocation of pension funds from bonds to UK equities as a measure to unlock domestic investment for the science and technology sector is both mentioned in the "[National Vision for Engineering Biology](#)" (2023), and has been highlighted by George Freeman, MP, in [a LinkedIn post dated 2024-10-27](#).

23. *The Centre for Long-Term Resilience did not answer this question.*

Business Environment – Trade and International Partnerships

24. How can international partnerships (government-to-government or government-to-business) support the Industrial Strategy?

The Government should seek to establish formal collaborative frameworks with partner nations for joint industrial development of the life sciences sector, including in pharmaceuticals. This is known as "friend-shoring", as opposed to offshoring or reshoring. The UK is unlikely to be able to produce all of the materials it needs to sustain a fully self-sufficient life science industry, especially in the 10 years covered by this strategy. This is acknowledged in the previous administration's "[Critical Imports and Supply Chains Strategy](#)" (2024), which states "It is neither desirable nor feasible for [UK] domestic production to replace imports for the majority of critical goods". Globalised supply chains with an over-reliance on single nations and ultra-localised supply chains both offer substantial opportunities for nefarious actors to undermine UK resilience by exploiting single points of failure. The most stable and robust supply chains are diversified regional supply chains, which draw upon the relevant strength of partner nations to build in redundancy and efficiency. Thus, the UK Government should actively engage in government-to-government bilateral and multilateral discussions to develop this model for critical supply chains.

25. *The Centre for Long-Term Resilience did not answer this question.*

Place

26. *The Centre for Long-Term Resilience did not answer this question.*

27. **What public and private sector interventions are needed to make strategic industrial sites ‘investment-ready’? How should we determine which sites across the UK are most critical for unlocking this investment?**

The Government should further develop opportunities in regions and nations of the UK (other than London and the South East) which already have strong established life sciences industries. This might include the Norwich area, home to the Norwich Research Park composed of the John Innes Centre, Quadram Institute, Salisbury Lab, and the University of East Anglia; Oxfordshire, home to both the Harwell Science and Innovation Campus and the Milton Park Science and Technology Park; or Cheshire, home to the Mereside life science campus at Alderley Park. There is no need to reinvent the wheel: centres of excellence and high industrial capacity already exist all over the UK. The Government must simply make an objective and informed assessment of the location of these centres, and double down on its commitments to them.

28. *The Centre for Long-Term Resilience did not answer this question.*

29. *The Centre for Long-Term Resilience did not answer this question.*

Partnerships and Institutions

30. *The Centre for Long-Term Resilience did not answer this question.*

31. **How should the Industrial Strategy Council interact with key non-government institutions and organisations?**

The Industrial Strategy Council should regularly hear from non-Government institutions and organisations such as independent think tanks, learned societies, charities, academia, and industrial trade associations. There should be clear mechanisms for continuous feed-in from these “third sector” organisations, such as a dedicated and monitored email inbox providing a direct line to the Council. In addition, it would benefit the Industrial Strategy Council to open a call for expressions of interest from the third sector, so that a dedicated single point of contact can be provided by organisations who wish to engage further with the Council. This will allow the Council to build up a database of relevant actors in a light-touch, low-cost way. The Industrial Strategy Council should also participate in and/or host events regularly with third sector organisations, to ensure that the full breadth of opinions from industry, academia, and independent think tanks percolate into its thinking. This can be as involved as organising the events internally or as simple

as requesting that an independent third-sector organisation do so—there is often capacity in these organisations, and a strong desire to interact with those close to policy levers in relevant spaces.

32. *The Centre for Long-Term Resilience did not answer this question.*

Theory of Change

33. *The Centre for Long-Term Resilience did not answer this question.*

34. *The Centre for Long-Term Resilience did not answer this question.*

35. **How would you monitor and evaluate the Industrial Strategy, including metrics?**

The Government should consider data (pre- and post-implementation of the Industrial Strategy) on: 1) the total amount of foreign direct investment; 2) the number of startup biotechnology companies remaining in the UK for series B/C/D funding; 3) the resilience of the pharmaceutical supply chain as measured by stocks of key countermeasures held on UK soil, APIs manufactured domestically, and diversity of sourcing/reliance on single sources of components for key countermeasures. This would capture the key outcomes of the Industrial Strategy's effects on the life sciences industry.

Additional Information

36. **Is there any additional information you would like to provide?**

The Centre for Long-Term Resilience is currently undertaking two projects relevant to the Industrial Strategy which have substantial buy-in from industry, the third sector, academia, and even relevant Government teams. These concern (1) supply chain resilience for biological preparedness (i.e. sourcing, domestic manufacturing, and stockpiling of antimicrobials, diagnostics, and vaccines); and (2) how the UK can secure long-term growth in the bioeconomy by retaining biotechnology startups with national security implications. We plan to share the outputs of these projects with the Department for Business and Trade ahead of the Industrial Strategy's final drafting for consideration. We would welcome the opportunity to discuss report findings with DBT officials ahead of their publication.

More broadly, we hope that resilience is mentioned explicitly in the final Industrial Strategy, and that the nation will be guided towards investment and development which grows our security in the long-term. As the previous administration's "[Critical Imports and Supply Chains Strategy](#)" (2024) states, "building UK capacity in relevant sectors can enable greater diversification and enhance overall supply chain resilience". The UK has a headstart in the life sciences sector; we must make

sure that we retain and grow it in the interest of the nation's resilience to the shocks certain to come our way.