The Productivity Institute's Response to the Industrial Strategy Green Paper

November 2024

This document presents The Productivity Institute's (TPI) feedback on the government's Industrial Strategy (IS) Green Paper, incorporating insights from TPI-affiliated researchers and experts.

TPI strongly welcomes the principles outlined in the green paper, as well as the establishment of the Industrial Strategy Council (ISC), which are key components of the overall growth strategy. Identifying and supporting key technologies, sectors, and clusters is essential for the UK's economic growth and prosperity. We also support the crucial themes of diffusion—extending ideas and technologies to new firms, people, and places, enabling them to improve productivity and share in growth.

At the outset, we emphasize several key elements central to our responses.

Integration of the Industrial Strategy in the Growth Agenda

The Industrial Strategy is a vital part of a comprehensive plan to achieve sustained growth for the UK economy. In our ***2023 Productivity Agenda*** (Coyle, van Ark, & Pendrill, 2023), the ***Productivity Plan for the 2024 General Election*** (van Ark & Pike, 2024) and subsequent writings (van Ark, Valero and Westwood 2023; Wilkes and Westwood, 2024), we have emphasized that productivity should be the central focus of this growth strategy.

Effective coordination across government and its various levels is essential. This involves collaboration between the Department for Business and Trade (DBT) and Her Majesty's Treasury (HMT), the Department for Science, Innovation and Technology (DSIT), the Department for Education (DfE), and the Ministry of Housing, Communities and Local Government (MHCLG) and many other departments too (including health, transport, energy, defence). Additionally, it requires alignment between the ISC and Skills England (SE) (Westwood, 2024), as well as existing entities like UK Research and Innovation (UKRI), Innovate UK, and the Office for Students (OfS) and others relevant to key sectors and sub sectors.

The role of HMT is critical in supporting IS, driving coordination, and aligning it with the overall growth strategy, which it oversees. Resources will also be crucial, and the IS white paper/full strategy, like others which will emerge alongside the Spending Review 2 (SR2) in late Spring 2025, will determine how much can of the strategy can be adequately funded which HMT controls.

Prioritisation and Continuity

Prioritization and making choices are essential for IS. It cannot do everything everywhere. It has made good progress in identifying eight sectors and various principles and priorities, including geography. Further focus on sub-sectors and places will be critical, as summarised in our responses below.

In terms of skills and RDI, the systems managed by DfE/Skills England (and OfS) and DSIT/UKRI must be aligned with the strategic prioritisation of activities that support the IS. DBT and the ISC need to effectively communicate directives to these departments and bodies to ensure they are implemented.

Continuity and long-term commitment are vital. Recent policies, such as DSIT Cluster Maps and initiatives like Innovation Zones (IZs), Local Skills Improvement Plans (LSIPs) and Innovation Accelerators, provide helpful continuity. When these align with the Industrial Strategy, they should be expanded and accelerated.

Coordination with Regional and Local Governments

Much of the industrial strategy will need to be implemented at the local level, focusing on key areas for the IS and growth in second-tier cities with significant sectors and clusters. Strong links between the emerging and established Mayoral Combined Authorities (MCAs) and central government are vital for planning investable sites and attracting investors. Building capacity and scaling interventions in these areas are crucial. This approach emphasises prioritization, local capacity, and delivery, concentrating resources on local FE institutions and R&D facilities. MCAs also need the capacity to identify and pitch locations for FDI.

Next steps

In following up on those comments, TPI partners, its Productivity Forums across the country and the Productivity Policy Unit will closely collaborate with government departments and other bodies, including those at devolved levels in Scotland, Wales, Northern Ireland, and with MCA in England.

Contributors

The responses below are collated from comments by various contributors from across The Productivity Institute. The insights often rely on TPI-funded research and. where relevant, we provide such references.

As indicated, some contributors submitted longer versions separately to the DBT consultation.

- **Prof. Tera Allas**, University of Manchester, TPI Governor
- **Dr. Nathan Critch**, University of Manchester, TPI Researcher
- **Prof. Nigel Driffield**, University of Warwick, TPI Co-Investigator (also separately submitted)
- **Prof. Jun Du**, Aston University, TPI Co-Investigator
- **Owen Garling,** Bennett Institute of Public Policy, University of Cambridge, TPI East Anglia Productivity Forum
- **Prof. Richard Jones**, University of Manchester, TPI Productivity Fellow (also separately submitted)
- **Dr. Darcy Luke**, University of Manchester, TPI Researcher
- **Prof. Philip McCann**, University of Manchester, TPI Co-Investigator (also separately submitted)
- **Prof. Raquel Ortega-Argilés,** University of Manchester, TPI Co-Investigator and Head of Productivity Lab (also separately submitted)
- **Prof. Adrian Pabst**, NIESR, (also separately submitted)
- **Prof. Stephen Roper**, University of Warwick, TPI Co-Investigator
- **Prof. Chander Velu**, University of Cambridge, TPI Co-Investigator
- **Prof. Anna Vignoles,** Leverhulme Trust, TPI Policy Fellow
- **Prof. Graham Winch**, University of Manchester, TPI Co-Investigator

The responses have been edited by **Prof. Bart van Ark**, University of Manchester, TPI Managing Director, and **Prof. Andy Westwood**, University of Manchester, TPI Policy Director.

A separate submission was also made by TPI's Midlands Productivity Forum (Edwards, Loughborough Business School)

Sector Methodology

Question 1

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

Historically, the UK has identified similar sectors as important across various industrial policies since 1990, indicating a consensus on areas of economic and technological strength and an element of continuity. However, the UK's productivity performance suggests a need for more granular identification and an improved policy implementation framework. This includes understanding complex supply chains and spillovers. (Coyle, D., & Muhtar, A. 2022)

To identify the most important subsectors for delivering the UK's objectives, the government should consider several factors:

1. **Importance in the current UK Economy**:
    - **Contribution to GVA**: Assess the existing relative contribution of subsectors to the Gross Value Added (GVA).
    - **Productivity Growth**: Evaluate the record of productivity growth to date.
    - **Regional Importance**: Balance contributions to national GVA and productivity growth with the distribution of subsectors across the UK, especially in underperforming cities.
    - **Export Intensity**: Consider the export intensity of subsectors.
    - **Attract Private Investment**:
    - **Wider Economic Growth**: Determine the importance of subsectors in underpinning broader economic growth, including crowding in of private sector investment
2. **Contribution to Non-Economic Objectives**:
    - **National Security**: Assess the subsector's role in national security.
    - **Net Zero**: Evaluate contributions to achieving net zero emissions.
    - **Supply Chain Resilience**: Consider the subsector's impact on supply chain resilience.
3. **Potential for Future Growth**:
    - **Technological Opportunities**: Identify new technological opportunities, supported by a strong R&D base and potential for research translation.
    - **Market Size**: Assess the significant market size.
    - **Innovation through Procurement**: Look for opportunities to drive innovation through procurement.

The establishment of the Industrial Strategy Council (ISC) is seen as an opportunity to create a learning mechanism that coordinates and compiles local knowledge. Detailed sector knowledge is crucial, and science and innovation audits should be systematic and repeated to inform policy development. Different sectors require different types of interventions and information. For example, life sciences may need policies around public-private research collaboration, while the digital sector needs strategies to scale up small enterprises.

The green paper lacks clarity on whether the strategy should be sector- or place-based. If the strategy is national, prioritization should focus on subsectors growing fast globally, with healthy returns on investment and strong UK competitiveness. A place-based approach is more likely to include such considerations as the number and growth of jobs and local/regional considerations. A mixed approach is at risk of failure unless there is a clear, strategic focus on specific sectors tied to specific places.

Based on contributions from: Owen Garling, Bennett Policy Institute; Richard Jones, University of Manchester; Tera Allas, TPI)

Question 2

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

To effectively account for emerging sectors and technologies, the UK government should adopt new data collection techniques, such as AI, web-scraping, and real-time industrial classifications, alongside qualitative methods. Traditional datasets and Standard Industrial Classification (SIC) codes are inadequate for capturing the nuances of these sectors. TPI's Productivity Lab supports this work in a collaboration with the DataCity.

Key strategies include:

- **Utilizing granular data**: Focus on detailed information like patents and emerging technologies.
- **Flexibility in approach**: Allow room to adapt and support promising sectors as they develop.
- **Long-term planning**: Implement a 10-year industrial strategy with mechanisms to adjust priorities over time.

Examples of innovative data approaches include:

- **Support for the ONS's Data Science Campus** and similar initiatives, like ESCoE, is essential for systematic data collection.
- **Real Time Industrial Classifications (RTICs)**: Used by TPI's Productivity Lab and the Bennett Institute based on Data City, combining web-scraping, machine learning, and expert input. (Selvi & Garling, 2024)
- **Glass.ai's data linking**: Integrates web-scraped and company data to understand sectors like AI.

Additionally, sector experts should validate algorithms and analysis results. For example, the Industrial Strategy Council could manage a council of experts to understand emerging sectors. Interview-based longitudinal studies of stakeholders can help align economic incentives and design new business models for technologies like quantum computing, engineering biology, and advanced robotics (Velu et al, 2023). This approach helps reduce learning and adaptation costs, ensuring that industrial policy remains relevant and effective.

Based on contributions from: Owen Garling, Bennett Policy Institute; Chander Velu, University of Cambridge; Tera Allas, TPI.

Question 3

How should the UK government incorporate foundational sectors and value chains into this analysis?

The foundational economy coexists with the broader economy, and both must thrive together for overall success.

It is crucial to recognize that foundational sectors underpin high-value tradable goods and services. Academic research emphasizes understanding how value is distributed across supply chains, influenced by market power and intrinsic importance. For example, the potential for technology adoption, especially green technologies, within foundational sectors, which can indirectly impact economic output by affecting population health.

It is important not to view advanced and foundational sectors as entirely separate, as supply chains often cross sector boundaries. Foundational sectors, which provide critical inputs and infrastructure, support various high-value activities.

A place-making approach is essential for integrating foundational sectors and value chains into industrial policy. For instance, developing a science-based sector requires proximity to universities or research centres, attracting skilled workers globally, and providing adequate housing and amenities. (See also responses to question 26)

Based on contributions from: Richard Jones, University of Manchester; Owen Garling, Bennett Policy Institute

Question 4

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

The UK government should focus on several key subsectors and technologies to drive economic growth and innovation:

1. **Advanced Manufacturing**:
    - **Pharmaceuticals**: Complex therapeutics require sophisticated manufacturing processes.

    - **Chemicals**: Important for GVA and productivity, with opportunities in sustainable supply chains.
    - **Materials**: Leveraging opportunities in the net-zero economy.
    - **Medical and Healthcare Technology**: Non-pharmaceutical interventions driven by NHS procurement.
2. **Clean Energy Industries**:
    - **Civil Nuclear**: Urgent need for new nuclear builds (including small nuclear reactors) and supply chain development.
    - **Carbon Capture and Storage**: Focus on hard-to-decarbonize industries.
    - **Zero Carbon Building Technologies**: Innovations for building and retrofitting.
    - **Battery Technology**: Need for public investment.
    - **Windfarm Connectivity**: Enhancing local and regional economies.
    - **Green Steel Production**: Investment in clean steel.
3. **Creative Industries**:
    - **Media, Music, and Gaming**: Significant economic impact and ("soft power") international influence.
4. **Defence and Security**:
    - **Cybersecurity and Military Applications of AI**: Potential for valuable spillovers into civilian applications.
    - **Defence Industry**: Boosting productive capacity (e.g. missiles, drones and ammunition) and partnerships (for example, with Ukraine) for exporting military equipment and resource imports (titanium, lithium, uranium and graphite) which are vital to develop and produce battery technology.
5. **Digital and Technologies**:
    - **Semiconductors and Photonics**: Niche strengths with national security implications.
    - **Quantum Technologies**: Emerging opportunities.
6. **Financial Services**
    - **E-commerce and Fintech**: Building on existing advantages.
7. **Life Sciences**:
    - **Diagnostics and Genomics**: Essential for precision medicine.
    - **Digital Health Technologies**: Unlocking medical datasets with AI, while addressing trust and privacy.
8. **Professional and Business Services**:
    - **Commercial Contract R&D Services**: Increasing importance in the economy.

It is essential to maintain a broad perspective on how sub-sectors integrate into the larger ecosystem, considering sectoral, supply-chain, and place-based contexts. Focusing on technologies that connect different sectors can drive broader economic growth. This necessitates coordination across government departments and between national, regional, and local governments, along with strong collaboration with business trade organizations.

The strategy should also consider location-based efforts, focusing on high-potential regions and supporting the diffusion of productivity-enhancing practices across sectors. This approach can leverage agglomeration effects and shared know-how, as seen in the UK games industry (See also responses to question 26).

Based on contributions from: Richard Jones, University of Manchester; Adrian Pabst, NIESR; Owen Garling, Bennett Institute.

Question 5

What are the UK's strengths and capabilities in these sub sectors?

Think in terms of supply chains, and how different activities support each other. For example, financial services could be leveraged to boost investment in other sectors, such as through innovative use of pension funds in a place-based context.

Based on contribution from: Nigel Driffield, University of Warwick.

Question 6

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

Key enablers include government procurement and regulatory reform. Barriers include skills mismatches and low R&D intensity, particularly at the development and translational end of the spectrum.

Based on contribution from: Richard Jones, University of Manchester.

Business Environment

Question 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 major generic barriers to investment are **Political and Economic Uncertainty** (Chadha and Venables, 2023), **Regional Disparaties**, **Inadequate Infrastructure, Financial Risks** and **Excessive Regulation**. Long-term planning, policy stability, and targeted investments in skills and infrastructure are crucial for fostering a conducive environment for investment and economic growth. Overcoming these barriers for investment requires coordinated efforts from the government, businesses, and educational institutions.

Sector-specific barriers focus on:

1. **Skills Shortages and Management Constraints (see also question 8 and 9)**:
    - A lack of necessary skills, particularly in AI and other advanced technologies. The main barrier to AI adoption indicated by businesses is limited AI skills, expertise or knowledge, followed by the price of adoption being too high (The IBM Global AI Adoption Index, 2022).
    - Mid-career skilling is a critical gap driven by a lack of adult skills training and technical education and there is a need to integrate higher education and further education offerings on a sector-by-sector basis.

- Difficulties in recruitment and development of business leaders as key barriers to growth (Scale-Up Report on UK Economic Growth, 2014).
- Instability in skills policy has led to regional skills shortages and inefficient use of the existing skills base. The UK's research infrastructure focuses on basic research, limiting the economic impact of innovations and their diffusion across the economy.

2. **Underperforming Research and Development (R&D)** (see also question 10):
    - High costs and perceived risks are major barriers to innovation (UK Innovation Survey, 2021).
    - The UK has a strong track record in basic research but struggles to translate innovations into applied research and economic value.
3. **Financial Risks**:
    - Even when capable of realising innovations, UK business seem to face challenges to scale them up and appropriate their value (NIESR/TPI Productivity Commission, 2022, 2023).
    - Intangible-intensive sectors, such as those relying on AI, face higher challenges in securing finance due to the illiquid nature of intangible assets (Crouzet and Eberly, 2019).
    - There is a need for policies to derisk investments in sectors with longer development cycles, such as green energy, biotech and aerospace. For example, the UK aerospace sector's profit margins have declined due to reduced investment in intangible capital among SMEs. The Sharing in Growth (SiG) programme, funded by the UK government and industry, enhances intangible capital through training, boosting productivity and profit margins for participating SMEs. (Said et al., 2022). Similar initiatives are needed to overcome investment.
    - Businesses often rely on internal resources for investment, which is easier for larger companies.
    - Public business bank lending is significantly lower in the UK (British Business Bank) compared to countries like Germany (Kreditanstalt für Wiederaufbau).
    - Access to finance is challenging outside London and the South East. Notably the price and availability of capital varies greatly between London and other regions. London has deep capital markets, but these do not serve the majority of the UK. Since the 2008 financial crisis regions outside London have struggled with high risk-premia and low investment yields, similar across all sectors. The government's current sector-focused approach does not address these regional disparities, making it difficult for most of the country to attract competitive investment capital. (Daams et al. 2024).

Based on contributions from: Richard Jones, University of Manchester; Philip McCann, University of Manchester; Adrian Pabst, NIESR; Owen Garling, Bennett Institute; Chander Velu, University of Cambridge; Darcy Luke & Nathan Critch, University of Manchester.

Business Environment – People and Skills

Question 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?

On the supply side, the key barriers are:

1. **Educational Inequality and Lack of Funding**:
    - The long tail of low achievers is closely tied to educational inequality, with students from poorer households often having lower skills. (Vignoles, 2024)
    - Funding for schools has become less progressive when comparing the poorest and most advantaged quintiles of the population. (Farquharson *et al.* 2022)
    - There has been a significant decline in funding for Further Education (FE) and sixth form colleges, exacerbating inequality. (Sibieta 2021)
2. **Skills Deficiency**:
    - The population's deficiency in basic and intermediate skills is a significant barrier to productivity. (Farquharson *et al.* 2022)
    - There is a high value placed on basic and social skills combined with technical skills, but many students leave the school system lacking these. (Vignoles, 2016; Machin et al. 2020; Dickerson et al., 2023)
3. **Narrow Post-16 and Higher Education (HE) Offerings**:
    - The UK's post-16 education system is narrow compared to global standards, affecting both academic and vocational routes. (Buscha et al. 2023)
    - There is a substantial graduate skills mismatch, with variations in employment prospects by degree subject and region. (Stansbury et al. 2023; Vecchi & Robinson 2023)
4. **Limited Opportunities for Apprenticeships and Vocational Training**:
    - Apprenticeship opportunities are limited, and there are significant shortages in Level 4/5 technical/vocational skills. (Cavaglia et al. 2022)
    - The funding model favours academic HE routes over vocational routes, leading to an insufficient supply of technically qualified people.

There are a range of practical policy solutions to tackle the challenges on skills:

- **Better integration of skills and innovation policies, potentially at a city-region level:** Universities should collaborate more regionally and with FE sectors to address skills shortages. For example, the University of Manchester supports the GM Civic University Agreement, working with local colleges to address skills shortages and integrate into the city's innovation ecosystem. The Innovate UK's pilot Further Education Innovation Fund is endorsed for building FE sector capacity and should be extended. Sustained investment in vocational training and regional skills development is essential, supported by incentives like tax credits.

- **Addressing uneven management skills, particularly in SMEs**: University business schools can play a role in addressing this. The University of Manchester has launched OPEN SME, an online platform to support SME management skills development.
- **Focus on lifelong and flexible learning, alongside traditional degree delivery**. Providing technical training and targeted upskilling for adults, especially in sectors at risk of automation, is crucial. Establishing regional education institutions for retraining adults without formal qualifications can address local skills shortages. These programs should combine academic coursework and apprenticeships for comprehensive learning. Additionally, expanding the apprenticeship levy into a flexible scheme would allow firms to invest in various certified training programs, encouraging workforce skills development and bridging the skills gap (de Coulon et al. 2022).

To address the issues in full, the key task is for the ISC to work with **Skills England** supporting the development of a cohesive policy framework aligning HE, FE, and work-based learning, including a sustained investment in vocational training and regional skills development as part of the long-term economic strategy. (Grimshaw, O'Mahony and Westwood, 2023). Planning for skills supply at the regional level, changing the funding model, and ensuring high-quality skills provision across regions are crucial. The Lifelong Learning Entitlement's implementation will be key to reversing the decline in adult learning and retraining.

Based on contributions from: Anna Vignoles, Leverhulme Trust; Richard Jones, University of Manchester; Adrian Pabst, NIESR; Owen Garling, Bennett Institute; Chander Velu, University of Cambridge).

Question 9

What more could be done to achieve a step change in employer investment in training in the growth-driving sectors?

To boost demand for skills, several strategies are proposed:

1. **Improve Management Skills**: Address management as a key barrier to implementing changes that increase skill demand.
2. **Incentivize Employer Investment**: Use tax incentives to encourage employers to invest in skills, particularly through apprenticeships for young people.
3. **Enhance Coordination**: Improve collaboration between the skills system and firms at the regional level.
4. **Link Training to Job Progression**: Make training investments a condition for public sector contracts and incentivize innovation to increase skill demand.
5. **Support Further Education (FE)**: Provide financial incentives, such as tax breaks and grants, to support FE and embed it in local ecosystems.
6. **Specialized Training Centers**: Establish regional centers for electrification skills, including battery manufacturing and R&D.
7. **Tax and Migration Policies**: Offer tax incentives and allow unlimited high-skilled migration in exchange for training UK nationals.

Based on contributions from: Anna Vignoles, Leverhulme Trust; Nigel Driffield, University of Warwick; Darcy Luke and Nathan Critch, University of Manchester.

Business Environment – Innovation

Question 10:

Where you identified barriers in response to Question 7 which relate to RDI and technology adoption and diffusion, what policy solutions could best address these?

Below is a summary of the key barriers to Research, Development, and Innovation (RDI) and technology adoption in the UK, along with policy solutions to address these challenges. The policy solutions are aimed at creating a more balanced and supportive environment for RDI and technology adoption across the UK, fostering regional growth and enhancing the country's innovation capabilities.

1. **University R&D Funding** (Richard Jones, University of Manchester):
    - **Barrier**: The UK heavily relies on universities for public sector R&D, but universities are financially strained, often subsidizing R&D with funds from other activities.
    - **Solution**: Increase funding for university R&D and reduce reliance on cross-subsidies. Expand programs like the Higher Education Innovation Fund and the pilot Regional Innovation Fund to support innovation ecosystems.
2. **Innovation Diffusion** (Richard Jones, University of Manchester):
    - **Barriers**: Limited regional collaboration and support for innovation diffusion.
    - **Solution**: Strengthen regional innovation ecosystems through collaboration between universities, further education (FE) sectors, and national organizations like the High Value Manufacturing Catapult. Expand the geographical reach of these institutions (E. O'Sullivan, R. Jones, G. Anzolin, 2024).
3. **Geographical Funding Imbalance** (see also question 28):
    - **Barrier**: Concentration of R&D funding in the Greater Southeast limits growth in other regions. (Stansbury et al. 2023)
    - **Solution**: More evenly spread R&D funding can provide greater national investment and growth opportunities. While peripheral regions are more exposed to economic risks from advanced technologies but offer new opportunities for green investments, despite concerns about their ability to leverage these opportunities (Ortega-Argilés and Yuan 2024).
4. **Intangible Assets**:
    - **Barrier**: Intangible assets (e.g., intellectual property) are hard to finance due to lack of collateral and high depreciation rates. (Crouzet and Eberly, 2019; Thum-Thysen et al. 2019)
    - **Solution**: Implement tax credits and accelerated amortization for intangible investments. Provide government guarantee schemes to support businesses lacking collateral.
5. **Firm Experience in R&D**:
    - **Barrier**: New firms face higher costs and risks in starting R&D compared to experienced firms.

    - **Solution**: Offer financial support and incentives for new firms to engage in R&D. Ensure subsidies are conditional on market viability of innovations.
6. **Absorptive Capacity**:
    - **Barrier**: Many firms lack the capacity to absorb and utilize new technologies. (Castellani et al., 2024)
    - **Solution**: Focus on firm-level interventions to boost skills and access to finance. Address aggressive supply chain management practices in low tiers supply chains that limit margins and investment capacity.
7. **Sector-Specific Strategies**:
    - **Barrier**: Lack of targeted industrial strategies.
    - **Solution**: Develop sector-focused strategies in areas like electric vehicles, sustainable heat, and personalized medicine. Learn from successful models like the Faraday Institution.
8. **Technology Diffusion Hubs**
    - **Barrier**: Regulatory uncertainty and rising credit costs hinder RDI investments.
    - **Solution**: Establish regional technology diffusion hubs to provide stable support, expert guidance, and resources for businesses. These hubs should collaborate with local authorities, industry bodies, and research institutions.

Based on contributions from: Adrian Pabst, NIESR; Richard Jones, University of Manchester; Nigel Driffield, University of Warwick; Raquel Ortega-Argilés, University of Manchester; Owen Garling, Bennett Institute; Tera Allas, TPI.

Question 11:

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

The UK government should consider several barriers to R&D commercialization:

1. **University Collaboration**: Universities need innovative ways to expedite research commercialization, emphasizing collaboration.
2. **Finance Access**: Spin-outs and licensing face financial barriers, especially outside the Golden Triangle, and struggle to scale up.
3. **Corporate Partnerships**: Partnerships with large corporates are crucial for technology commercialization and should be incentivized.
4. **SME Support**: SMEs need mechanisms to support innovation diffusion, building on successful schemes like Innovate UK's Knowledge Transfer Partnerships.
5. **Funding Redistribution**: Redirect funds from low-value research to customer-focused product/service design and sales.
6. **Venture Capital**: Encourage regional investment approaches, including imaginative use of pension funds, to support both active and passive investment.
7. **Public/Private Investment**: Address the gap in large-scale VC and private equity for manufacturing with public/private partnerships.

Based on contributions from: Richard Jones, University of Manchester; Nigel Driffield, University of Warwick; Darcy Luke and Nathan Critch, University of Manchester.

Business Environment – Data

Question 12:

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

To support the Industrial Strategy, the UK government should (see also question 2):

1. **Invest in Data**: Ensure adequate investment in data for policy development and implementation, requiring new methods, governance, and security.
2. **National Data Library**: Develop this as the basis for a policy data infrastructure, integrating with existing investments like ADR UK.
3. **Legal Framework**: Establish a legal and regulatory framework for broader data use across the economy to enable productivity improvements through increased data use and predictive analytics.
4. **Data Sharing**: Address challenges in data sharing, including legal mandates for private sector data, supply chain governance, and legal assurances for data security.
5. **Rejoin DESI**: Participate in the European Commission's DESI data gathering for comprehensive insights on technology adoption.

Based on contributions from: Owen Garling, Bennett Institute; Darcy Luke and Nathan Critch, University of Manchester.

Question 13:

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

To improve business operations and decision-making, the UK government could (see also question 12):

1. **Put the UKRI-funded ADR Programme on a statutory footing** to lead data integration, breaking legal barriers in government silos that block data-sharing and evidence-based coordination. New Zealand's law change highlights how the UK can mitigate this self-imposed governance problem.
2. **Provide legal clarity** to reduce regulatory risks across various data use cases, potentially aiding the development of an insurance market.
3. **Coordinate market players and industry bodies** to create data pools through agreed-upon metadata and standards, similar to Germany's steel and chemicals sectors.
4. **Support the development of technical tools** to enable data access from different sources and disseminate software and know-how. Modest public investment in these areas could unlock data use potential for many companies. OpenSAFELY is an example of such an open platform, though it is limited by the inability to link NHS data with other sources.

Based on contribution from: Raquel Ortega-Argilés, University of Manchester; Owen Garling, Bennett Institute

Business Environment – Infrastructure

Question 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?

The removal of 'Levelling Up' from MHCLG shifts focus to housebuilding and local government finances, neglecting local productivity issues. These financial and housing problems stem from regional productivity imbalances. Long-term solutions require improved productivity to support local economies. Proposed NPPF reforms should address regional productivity to underpin housebuilding and financial settlements. Reforming the land use planning system should prioritize addressing underlying productivity growth and economic development issues. (Alcock et al. 2024)

Decentralizing economic decision-making is crucial. Sharing some Treasury responsibilities with departments focused on economic and industrial strategies, and devolving aspects of IS to Mayoral Combined Authorities, can enhance regional growth. Revising the Treasury Green Book methodology to address spending biases and focusing on city-region transport development, including rail electrification, will improve connectivity and mobility. Improving connectivity between Northern cities and removing housing barriers in high-growth areas will further support regional development.

Enhancing regional tax-raising powers can reduce reliance on central grants, unlocking infrastructure and transport improvements.

Based on contributions from: Philip McCann, University of Manchester; Darcy Luke and Nathan Critch, University of Manchester

Question 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?

Investment in infrastructure is essential for the Industrial Strategy, but it needs to be planned across various infrastructure classes, including economic infrastructure (transport, energy, digital, water management), housing, natural capital, and social infrastructure. The strategy should integrate these needs through a place-based approach, considering the specific requirements of different sectors and regions. (Coyle et al. 2023)

It is essential to build in legal safeguards such that unilateral decisions made by a handful of people for political purposes, such as the decision by Rishi Sunak and a small number of advisors to stop HS2, can never again happen in future. The powers of (prime) ministerial fiat must be circumscribed, and those of Mayoral Combined Authorities must be legally entrenched. Otherwise, investors will not be willing to 'go big and go long' in infrastructure-related arenas. (McCann 2023)

The establishment of the National Infrastructure Strategy and Transformation Agency (NISTA) is a significant step forward, but there are two key issues that need addressing:

1. **Conflict of Interest**: The merger of the National Infrastructure Commission (NIC) with the Infrastructure and Projects Authority (IPA) could create a conflict of interest, as NIC's role includes holding the government accountable for its infrastructure strategy. This can be resolved by giving the new Industrial Strategy Council the mandate to hold the government accountable.
2. **Lack of a Delivery Agency**: Unlike other developed countries, the UK does not have an infrastructure delivery agency. Such an agency could support infrastructure investment and economic growth by managing project delivery and governance separately to avoid conflicts of interest. This agency could be a public-private partnership to provide appropriate incentives.

An infrastructure delivery agency could (Winch, 2024):

- Manage regulatory processes to offer de-risked projects to private investors.
- Support the start-up of project owner bodies like HS2 Ltd.
- Act as a knowledge base for best practices in project delivery.
- Provide consistent commercial counterparts for delivery partners.
- Collect and analyze project data for better early-phase estimations.
- Maintain a database on supplier performance.
- Capture and disseminate productivity improvements across sectors.

Based on contributions from: Owen Garling, Bennett Institute; Philip McCann, University of Manchester; Graham Winch, University of Manchester)

Business Environment - Energy

Questions 16 and 17: no submissions

Business Environment - Competition

Question 18:

Where you identified barriers in response to Question 7 which relate to competition, what evidence can you share to illustrate their impact and what solutions could best address them?

There is no conclusive evidence that competition is a barrier to investment. Theoretical arguments and empirical evidence are mixed. While competition can drive investment to stay ahead of rivals, market power can provide profits for new investments. Predatory investment to exclude competitors is debated (e.g. Furman review). Overall, competition and competition policy are considered less influential on investment levels compared to other barriers, as seen in comparisons of UK investment with similar economies.

Based on contribution from: Owen Garling, Bennett Institute

Question 19:

How can regulatory and competition institutions best drive market dynamism to boost economic activity and growth

Balancing industrial policies and competition policy remains a complex and unresolved debate. To drive market dynamism and boost economic activity, regulatory and competition institutions should focus on several key areas:

1. **Labour Market Protection**: Enhancing labour market protections can encourage investment in skills by both individuals and firms. This can mitigate the fear of losing trained employees and the reluctance of individuals to change jobs due to "last in, first out" policies.
2. **Clear Regulation**: Implementing clear and high-quality regulations can open new markets. For example, the UK lags behind Europe in micro-mobility regulations (e.g. e-bikes, e-scooters, light electric goods vehicles), preventing local companies from entering the market.
3. **Financial Regulation Changes**: Adjusting financial regulations to encourage private equity investment in manufacturing can stimulate growth.
4. **Effective Competition Authorities**: The UK's Competition and Markets Authority (CMA) is highly regarded and plays a crucial role in ensuring dynamic markets and high productivity. Competition encourages both the exit of less productive firms and the entry of new ones.
5. **Technological Adaptation**: Regulatory approaches must evolve to address technological transformations such as net zero and digital/AI. This includes understanding the changing identities of major players and blurred sector boundaries.
6. **Forward-Looking Perspective**: Regulators need to assess market dynamism with a forward-looking perspective, considering technological directions. The CMA's capacity to analyse market structures and its tools like Market Investigations are valuable.
7. **Coordination and Market Enhancement**: The UK Regulators Network facilitates coordination. Regulators should also focus on enhancing markets through data sharing and technology standards.
8. **Avoiding Market Dominance**: Addressing the challenges of market dominance, especially in the digital sector, is crucial. This includes preventing gaming of the system through legal challenges and lobbying by dominant companies.
9. **Government and Regulatory Roles**: While independent regulatory authorities should not be undermined, some decisions requiring political legitimacy may emerge. A mechanism is needed to reflect government priorities in competition decisions, particularly in growing UK companies in specific technologies or sectors.

Based on contributions from: Nigel Driffield, University of Warwick; Owen Garling, Bennett Institute

Business Environment - Regulation

Question 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?

Despite perceptions, the UK is not over-regulated compared to peers, as seen in the more regulated yet higher-investing European financial services sector. However, business support needs wholesale reform due to its current fragmentation and low quality.

In terms of the goals of regulation, competitiveness should be prioritized alongside efficiency, viewing value systems holistically. Specific reforms include micromobility legislation for low-cost, zero-emission mobility and changes to OFGEM and National Grid regulations to improve industrial site power access.

To encourage growth and innovation, regulation can be refined to speed up processes and reduce costs, for example, in sectors like medtech and pharma through in-silico methods to shorten development times and reduce costs in important parts of the life sciences sector.

Based on contributions from: Nigel Driffield, University of Warwick; Richard Jones, University of Manchester

Business Environment - Crowding in Investment

Question 21:

What are the main factors that influence businesses' investment decisions? Do these differ for the growth-driving sectors and based on the nature of the investment (e.g. buildings, machinery & equipment, vehicles, software, RDI, workforce skills) and types of firms (large, small, domestic, international, across different regions)?

The Productivity Institute (TPI) is investigating what influences firms' investment decisions through a large-scale survey of 1,500 UK businesses (TPI Investment Decisions Survey, 2024). Interim findings show that firms made an average of four significant investments over the past five years, with 47% being tangible, 43% a mix of tangible and intangible, and 9% solely intangible. On average, firms invested 14% of their turnover in tangible assets and 9% in intangible assets, primarily using internal funds. Key investment areas include machinery (62%) and buildings (52%) for tangible assets, and staff training (76%) and software or databases (74%) for intangible assets.

An initial evidence review show the following factors influencing investment decisions:firm size, exporting status, business structure, financial health, funding sources, human capital, management practices, return on investment, indirect benefits, uncertainty, business leaders' attitudes, stakeholders, investment history, policy interventions, and macro-economic conditions. Detailed results will be available at the end of 2024. (Golubova, 2024)

Businesses' investment decisions are also influenced by cost-benefit analyses, availability of public investment in R&D and skills, and the time required to realize returns. High-value, R&D-intensive

international firms, like AstraZeneca, are attracted to locations with significant public investment in research. The availability of long-term finance (patient capital) also affects decisions, especially for long-term, uncertain investments like RDI. These factors can vary based on the sector, type of investment, and firm characteristics.

Based on contributions from: Stephen Roper, University of Warwick; Richard Jones, University of Manchester; Adrian Pabst, NIESR

Business Environment - Mobilising Capital

Question 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 described in response to Question 7, since the 2008 financial crisis risk-premia and investment yield differences between London and other regions have been significant, affecting all sectors, As a result start-up and scale-up capital from angel and venture capitalists (VC) is heavily concentrated in London and its surrounding areas, accounting for over two-thirds of all VC activities. UK banks are reluctant to provide long-term debt capital outside London, leading to a lack of liquidity in other regions. Addressing these disparities requires institutional and governance reforms, including restructuring the UK financial services industry, creating new local banks, and establishing Urban Wealth Funds. These reforms should focus on cities to close the risk-pricing and investment yield gaps essential for driving growth. (Mayer et al. 2021)

Based on contribution from: Philip McCann, University of Manchester

Question 23:

The UK government currently seeks to support growth through a range of financial instruments including grants, loans, guarantees and equity. Are there additional instruments of which you have experience in other jurisdictions, which could encourage strategic investment?

Currently, the National Wealth Fund (NWF) is limited compared to regional bodies in Germany and France. Reforms to the UK Infrastructure Bank and British Business Bank (BBB) focus on green challenges, not broader regional finance issues.

Suggested reforms include expanding the British Business Bank (BBB) with branches in every growth pole often linked to universities and the wider ecology of science parks and start-ups). Another useful reform would be to create a National Development Bank, similar to Germany's KfW, combining the UK Infrastructure Bank, BBB, and 3i.

To improve regional access to finance, mayoral authorities should have independent capital-raising powers via bond issuances and rotating Urban Wealth Funds. Treasury oversight is perfectly reasonable, but Treasury should not be involved in decision-making agreements, as is currently the case with the PWLB. Increasing local tax flexibility and assigning some taxes from central to sub-central government can help de-risk investment. (Aldington et al. 2024)

Based on contributions from: Philip McCann, University of Manchester; Adrian Pabst, NIESR.

Business Environment - Trade and International Partnerships

Questions 24: no submission

Questions 24: no submission

Which international markets do you see as the greatest opportunity for the growth-driving sectors, and how does it differ by sector?

Recent trade statistics highlight key markets for the UK's strategic sectors, with the **US**, **EU**, and emerging economies such as China and India leading the way, followed by opportunities in the Middle East. Notably, seven out of the UK's top ten partners in terms of international flows (goods, services, capital, information, and people) are from the EU.

However, the opportunities vary significantly depending on the sub-sector and time period. Below is a detailed analysis based on recent trade data. Using data from **Trade Data Monitor (TDM)**, which provide timely trade statistics from 109 countries, we observe the following trends in exports for the UK's strategic sectors from 2013–2023:

1. **Overall Growth during 2021-2023**:
    - Strategic sectors exhibited **increases in export value**, often accompanied by growth in export varieties and volumes.
    - Creative industries showed the **highest growth** in export value during this period, followed by Defence, Clean Energy, and Advanced Manufacturing.
    - Digital and Technologies, along with Life Sciences, demonstrated **moderate growth**, trailing other strategic sectors.
2. **Sector-Specific Trends**:
    - Growth patterns were uneven across sub-sectors, with not all areas within a sector contributing equally.
    - Certain sectors outside the defined strategic priorities, such as **material-based manufacturing (e.g., nickel and base metals)** and **agriculture-related goods (e.g., cereals, fertilisers, organic chemicals)**, also demonstrated robust export growth in recent years.
3. **Historical Context**:
    - Many of the identified strategic sectors did not show significant growth in earlier periods (pre-2021), raising questions about whether the recent growth represents a **sustained trend,** or a temporary **post-pandemic rebound**.
4. **Global Value Chain Disruptions**:
    - Export growth is likely to experience significant shocks and adjustments in 2025 onward, influenced by geopolitical developments such as potential shifts in US trade policy under the Trump presidency and realignments in global value chains.

Based on contribution from: Jun Du, Aston University

Place

Question 26:

Do you agree with this characterisation of clusters? Are there any additional characteristics of dimensions of cluster definition and strength we should consider, such as the difference between services clusters and manufacturing clusters?

In addition to identifying clusters of firms in the same sector, we suggest to consider clusters of firms in different sectors in the same location. Too monolithic an approach to the definition of a cluster can easily miss important co-dependent economic groupings. Clusters should be defined by sector, technology, or region, and cluster-based activities should allow for flexibility around regional boundaries. True clusters capture external economies of scale or scope through knowledge sharing and shared resources. For example, the growth in financial services in Birmingham is beneficial to the West Midlands economy, but not a true cluster like the digital/creative sector in Warwickshire.

It is important to understand existing assets to identify necessary investments for supporting different clusters. Clusters also have supply chains, which will vary by technology or sector, and by location. The distinction between manufacturing and services is unhelpful, as high-value manufacturing often includes services, and high-value services can have close links with manufacturing supply chains.

Policy should aim to strengthen support individual clusters in the UK's second city-regions as productivity will be benefit from interactions between sectors in big city agglomeration economies.

Based on contributions from: Nigel Driffield, University of Warwick; Richard Jones, University of Manchester; Owen Garling, Bennett Institute

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 UK should create investment-ready sites that attract both domestic and international investors, fostering economic growth and development.

In terms of **Public and Private Sector Interventions** the focus has to be on:

1. **Infrastructure Improvements**:
    - **Power**: Ensure availability, competitive pricing, and low carbon content.
    - **Connectivity**: Enhance physical and digital infrastructure.
    - **Planning and Permitting**: Streamline processes and reduce costs.
2. **Ecosystem Development**:
    - **Skills and Innovation**: Develop local skills and innovation assets through universities, FE colleges, and institutions like Catapult Centres.

    - **Supportive Ecosystem**: Create an environment with research organizations, development facilities, and supply chain companies to lower entry barriers for investors.
3. **Universal Basic Infrastructure**:
    - Ensure a minimum level of services and amenities across all regions to reduce spatial disparities and make areas more attractive for investment.
4. **Inclusive Investment**:
    - Align investments with existing local strengths and assets to maximize returns and benefits for the community. The Place-Based Investment Campaign of The Productivity Institute is one good example of this approach, using a broad-based capitals.

To determine **Critical Sites for Investment** the following policy instruments can be deployed:

1. **Cluster Analysis** (see also question 26):
    - Identify and support existing industrial clusters that are crucial for specific sectors.
    - Consider creating larger regional clusters, for example the Cambridge-Milton Keynes-Oxford corridor, to unlock significant investments.
2. **New Towns Development**:
    - Focus on coordinated growth in new towns, leveraging historical examples of successful new town developments.
3. **Local Growth Plans** (see also question 28):
    - Develop comprehensive local growth plans with Mayoral Combined Authorities (MCAs) that include clear investment narratives and the capacity to engage with potential investors.
    - Coordinate growth plans across neighbouring MCAs.

Based on contributions from: Nigel Driffield, University of Warwick; Richard Jones, University of Manchester; Owen Garling, Bennett Institute

Question 28:

How should the Industrial Strategy accelerate growth in city regions and clusters of growth sectors across the UK through Local Growth Plans and other policy mechanisms?

The critical component of the Industrial Strategy is the balanced approach between central coordination and local empowerment to effectively support regional growth and innovation. To accelerate growth in city regions and clusters across the UK, the Industrial Strategy should leverage Local Growth Plans (LGPs) and policy mechanisms like Innovation Zones and accelerators.

Some of the key points are:

1. **Local Growth Plans (LGPs)**:
    - The 10-year growth plans strategies at the level of Mayoral Combined Authorities (MCAs) are essential for framing industrial strategy.

- They should integrate policies for transport, spatial planning, skills, and innovation to support economic growth.
- LGPs must reflect local needs rather than just aligning with national strategies, ensuring accurate representation of local economic conditions.
- Collaboration between neighbouring MCAs is crucial when economic clusters cross regional boundaries.

2. **Innovation Policy**:
   - Innovation should be a core component of Local Growth Plans, aiming to boost regional productivity and private sector R&D. For example, positive lessons can be learned from the Innovation Accelerator programme and the Further Education Innovation Fund and suggest building on these, with similar programmes of increased scale and duration, in more locations.
   - Innovation Zones and Accelerators should be central to LGPs, focusing on areas with high productivity or potential for high growth through research and technology, scaling up nascent activities and strengthening competitive sites. Universities, businesses, and the Further Education sector should work together to develop these plans.
   - Universities should also leverage their research strengths to create high-growth sectors, attract investors, develop skills, and support business development, especially SMEs.
   - There is a need for place-based funding instruments to build R&D capacity outside the Greater Southeast region.
3. **City-City Collaborations**:
   - Encouraging collaborations between cities, such as between Manchester and Cambridge, can enhance innovation ecosystems, with the research universities in both cities playing a key role.
   - Mechanisms like Investment Zones and Innovation Accelerators can help manage clusters and foster collaboration rather than competition.
4. **Devolution**
   - The ongoing devolution process means not all areas have the same powers and funding, which can affect the implementation of Local Growth Plans.
   - There is therefore a need for a wider government strategy to build capacity within local and regional governments, including adequate support for new combined authorities and addressing local government funding issues. For Local Growth Plans (LGPs) to be effective, power and resources need to be genuinely devolved, which has not fully happened yet.

Based on contributions from: Nigel Driffield, University of Warwick; Richard Jones, University of Manchester; Owen Garling, Bennett Institute; Darcy Luke and Nathan Critch, University of Manchester

Question 29:

How should the Industrial Strategy align with devolved government economic strategies and support the sectoral strengths of Scotland, Wales, and Northern Ireland?

As the Green Paper sets out, clusters and key sectors are not confined by regional or national boundaries, and there should therefore be significant co-ordination between the UK government, regional government and the devolved governments of Scotland, Wales and Northern Ireland.

Based on contribution from: Owen Garling, Bennett Institute

Partnerships and Institutions

Question 30:

How can the Industrial Strategy Council best support the UK government to deliver and monitor the Industrial Strategy?

The Productivity Institute has recommended that the ISC should have a broad remit, focusing on the entire economy and promoting stability and consistency in strategy, while building capabilities to respond to economic shocks. (van Ark, Valero and Westwood 2023) Some key design principles are independence for credibility, a long-term focus insulated from short-term issues, flexibility to adapt to new developments, and the ability to influence government machinery and create political leverage.

The UK government should enhance the stability and long-term focus of the Industrial Strategy Council (ISC). Ensuring the ISC's work is not discarded with political changes and promoting its findings can provide market stability. The ISC should collaborate with higher education and research institutions to foster evidence-led discussions.

The Industrial Strategy Council (ISC) should be representative of various industrial sectors and regions, authoritative with access to top academic research, and established on a statutory basis for long-term stability. The ISC should collaborate extensively with research organizations, including UKRI, higher education institutions, and think tanks. It should work with the government to develop measures to track the strategy's delivery, owning the analytical framework and measures described in the Industrial Strategy's Theory of Change.

Given the cross-government nature of the strategy, the ISC will play a key role in resolving coordination issues between departments and working with institutions like the Council of the Nations and Regions, the Climate Change Committee, and the Office for Budgetary Responsibility.

Based on contributions from: Richard Jones, University of Manchester; Owen Garling, Bennett Institute; Darcy Luke and Nathan Critch, University of Manchester

Question 31:

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

The Industrial Strategy Council (ISC) should interact with non-government institutions, including research organizations such as UKRI, higher education institutions, and think tanks, by promoting evidence-led appraisals of industrial strategy and coordinating research-led discussions.

Regional ISCs, linked to the LGPs, could be set up to collaborate with the national ISC to coordinate policy across the UK. The ISC should also engage in international fact-finding and comparative analyses to identify best practices. Dissemination of its work should be done both online and through traditional media, such as newsletters and quarterly reports.

Based on contributions from: Adrian Pabst, NIESR; Darcy Luke and Nathan Critch, University of Manchester

Question 32:

How can we improve the interface between the Industrial Strategy Council and government, business, local leaders and trade unions?

The ISC should seek to develop an experimental approach to policy-making by encouraging the formation of an Industrial Strategy Lab which engages with novel ideas for the enhancement of economic policy making.

Based on contribution from: Darcy Luke and Nathan Critch, University of Manchester

Theory of Change

Question 33:

How could the analytical framework (e.g. identifying intermediate outcomes) for the Industrial Strategy be strengthened?

A key part of any Theory of Change is that it is crucial to focus on intermediate outcomes rather than just ultimate outcomes like growth and productivity. Intermediate outcomes could include labor-force skills, innovation (e.g., number of patents), and infrastructure efficiency (e.g., travel times). These outcomes help understand where policies are effective and where adjustments are needed.

Utilizing existing networks such as What Works Centres, catapults, and research institutions like the Enterprise Research Centre and The Productivity Institute can provide valuable analysis. Effective coordination of policies and stakeholders is essential, aligning them around a shared understanding of improving productivity and growth inclusively.

The framework should also incorporate a place-based analysis, recognizing that growth occurs in specific locations and over time. This approach emphasizes the importance of coordination and tailored strategies for different regions.

Based on contributions from: Nigel Driffield, University of Warwick; Owen Garling, Bennett Institute; Darcy Luke and Nathan Critch, University of Manchester

Question 34:

What are the key risks and assumptions we should embed in the logical model underpinning the Theory of Change?

Key risks and assumptions include identifying specific market failures and whether they are demand or supply side issues. This requires detailed analysis of constraints, which vary by activity and location. The national Industrial Strategy should serve as a framework for local and sector-based interventions, aligning national policy with competitive intelligence. Regions must honestly assess their capabilities to build or reinforce supply chains and foster collaboration.

Based on contribution from: Nigel Driffield, University of Warwick

Question 35:

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

Monitoring and evaluating should focus on intermediate and final outcomes that drive productivity growth, such as exporting, innovation, and productivity. A structured, evidence-based approach is needed, aligning objectives with core goals like inclusive economic growth, reducing regional disparities, and driving innovation. Using a logic model, link objectives to measurable outcomes, from inputs like government funding to impacts on incomes, GDP growth, and inequality reduction. Investment in data and new statistical methods is essential, along with leveraging local know-how and addressing over-centralisation to improve economic insights.

Based on contribution from: Nigel Driffield, University of Warwick

Question 36:

Is there any additional information you would like to provide?

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