CITP and UKTPO Response to Invest 2035: The UK's Modern Industrial Strategy

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

PREAMBLE TO ALL ANSWERS: Before answering any question, it is important to clarify that these answers have been prepared by members of the UK Trade Policy Observatory (UKTPO) and the Centre for Inclusive Trade Policy (CITP). Together, these academic research centres assemble the country's largest collection of academic expertise on the world trading system, with specialists in economics, law, business and management, politics and international relations. The UKTPO is an interdisciplinary independent expert group of researchers based at the University of Sussex, covering all aspects of trade, aimed at bringing an objective view to trade policy debates and policymaking processes. The Observatory conducts independent original research on trade, provides impartial, evidence-based advice and commentary, and offers extensive training on trade and trade policy. The CITP is led by the team at the University of Sussex and comprises other universities across and beyond the UK. It is also an interdisciplinary centre of excellence for innovative trade policy research that provides an evidence-based interdisciplinary approach, founded on consolidated and independent research expertise.

In line with the expertise within the UKTPO and the CITP, the questions that have been answered are those that are most interlinked with international trade considerations.

ANSWER TO QUESTION 1:

The proposed Industrial Strategy Green Paper is committed to driving growth by harnessing strengths that are present in the current capacity within the UK. This reflects the intention to accelerate and ensure sustenance of ongoing growth rather than to initiate new areas of growth. In this regard, policymaking needs to be observant and learn from the experiences of other countries that have developed and implemented robust industrial policies. Thus, the UK strategy must be formulated with these external factors in mind (or be adaptable to them). This makes identifying areas for specialisation increasingly challenging in what is termed as the Fourth Industrial Revolution. Hence attention should be drawn to what characterises economic ecosystems and its components. Growth can be understood in various ways, but growth for stability and scalability requires targeted interventions at different points along the value chain. Not less important is the need to address upstream factors—such as resource inputs, innovation, and production efficiencies—that are essential for fostering resilient growth.

It is also worth remembering that "classical" definitions of sectors (and subsectors) have become much more blurred, as some features cut across sectors. The eight growth-driving sectors proposed in the Green Paper illustrate this challenge: digital considerations apply almost universally across sectors and advanced manufacturing techniques apply as much to the aerospace (defence) industry as to electronics, for example.

Keeping these caveats in mind, a common indicator that has been used widely to narrow the focus within sectors has been the Revealed Comparative Index (RCA). Changes in product-level Revealed Comparative Advantage can identify shifts in comparative advantage more quickly than sector-level analysis, which may hide changes due to aggregation. The strength of the RCA indicator is that it captures both a given country's supply side capacity and relative world demand for the good in question. Looking at changes over time in these respective component elements of the RCA is a powerful means of identifying where there may be (missed and active) export opportunities. However, a drawback of the RCA analysis is that it is backwards-looking, and cannot capture changes at the product extensive margin. Hence, it cannot be the only indicator, especially at a time of rapid technological change.

Assessing a sector's risk of inoperability and its degree of interconnectedness are important additional factors. Sectors with high interconnectedness serve as foundational pillars, supporting multiple downstream industries and essential services. A disruption in these key sectors risks triggering extensive ripple effects, compromising productivity and employment across the economy. Moreover, sectors that are both vital and interconnected often rely on complex supply chains and specialised inputs, increasing their susceptibility to global disruptions. Current measures of interconnectedness such as centrality measures (degree centrality, betweenness centrality) fail to capture dynamic interactions such as the adaptive behaviour of firms to global shocks primarily due to their reliance on input-output data and publicly available trade data – see answer to question 13 for more on this point. The application of network analysis offers a solution to this complexity. Various studies have applied network analysis to input-output data to study the interconnectedness between economic structures. This methodology augments the traditional centrality measures by offering to measure the "thickness" or "strength" of interconnections between sub-sectors. However, the use of this methodology requires granular data using ONS/HMRC firm and transactions level data if not private company datasets, which allow for the tracking of supply chains through different suppliers.

The focus on identifying (sub) sectors should not ignore that policy interventions are likely to generate externalities that can impact broader social and economic outcomes. Therefore, while it is crucial to identify sectors with strong growth potential, attention must be given to those that may be adversely affected by such interventions. This distinction between sectors that drive growth and those potentially harmed by policy actions can be referred to as the identification of 'strategic and sensitive sectors' – see UKTPO Briefing Paper 71: https://blogs.sussex.ac.uk/uktpo/files/2022/12/BP71v2.pdf.

Previous work by the UKTPO in this regard focuses on devising a summary list of indicators that are capable of indicating which sectors are increasingly susceptible to external shocks and which sectors offer growth opportunities in relation to trade policy measures. Using a combination of sectoral indicators (size, employment shares) and trade specific characteristics (labour intensity, vulnerability to foreign supply chains, trade exposure, trade barriers), the study evaluates how sectoral rankings can be identified. An important takeaway is that there is no single correct way to identify whether sectors are 'sensitive' to import competition or offer 'strategic' export opportunities. Considering how indicators impact import sensitivity or export opportunities is important, and similar observations are pertinent also for question 25.

<u>Recommendations:</u>

1.1 Identify and prioritise sectors for growth through a clear selective approach, as not all sectors can be prioritised simultaneously. The approach to sectoral identification must be driven by what characteristics of the current economic ecosystem hold potential for the future and sectors that can harness these qualities must be incentivised to grow.

1.2 Make available detailed analysis of ONS/HMRC firm-level transactions data to identify inter-sectoral linkages and track adaptiveness/responsiveness of firms to external or internal influences.

1.3 Given that existing methodologies to identify emerging "sectors" have limitations rooted either in their methodological construct or on the standard data sources they are dependent on, undertake detailed work and complement methodologies with quantitative and qualitative analysis such as case studies.

2. *How should the UK government account for emerging sectors and technologies for which conventional data sources are less appropriate?*
3. *How should the UK government incorporate foundational sectors and value chains into this analysis?*
4. *What are the most important subsectors and technologies that the UK government should focus on and why?*

In response to the geopolitical and trade tensions between US and China, the EU is striving to balance the defence rule-based international trade system, while securing its own autonomy in order to pursue green and digital transitions. The UK has therefore to identify its strategy within this rapidly changing scenario, both in terms of industrial and trade policy. In this context, the UK must tackle challenges on two fronts. First, to align (or not) to the European policy on open strategic autonomy and devise consistent trade and industrial policy strategies. Second, to formulate and implement industrial policy strategies to strengthen its competitive position in digital and green global value chains within the EU and globally.

It is worth noting that a significant share of imports of critical materials such as lithium, cobalt, copper, come from Europe (which does not produce them). As European countries are not among the major producers of these materials, this suggests the existence of a

complex trade network, most likely dominated by large multinational enterprises (MNEs). As for intermediate and final stage products, we find again the EU as a main supplier of the UK, although the share is steadily declining for computers and communication equipment. For this type of final products, the UK has been gradually replacing its European suppliers with Chinese exporters. As a result, China has gained prominence as a direct supplier to the UK economy, especially for computers and communication equipment.

However, increasing dependence from China, particularly in the EU context of strategic autonomy, might entail further divergence of the UK from EU strategies, while at the same time leading to further isolation from the US trade and security policy. Trade barriers with the EU area could still have unintended consequences concerning the sourcing of critical raw materials, even if the EU is not a major supplier due to the role of MNEs and their complex networks of activities.

<u>Recommendations:</u>

4.1 The UK should devise a clear strategy of investments and FDI in strategic sectors, particularly in critical minerals (and strategic digital infrastructure – see answer to question 13).

4.2 In view of the European positioning towards an 'Open Strategic Autonomy', the UK should consider a close alignment to the EU single market to maintain a stable global value chain supply and destination market.

5. *What are the UK's strengths and capabilities in these subsectors?*
6. *What are the key enablers and barriers to growth in these subsectors and how could the UK government address them?*

As an overarching input of production in any sector, it is essential to ensure the competitiveness of clean energy in the UK as a prerequisite to growth and to sustain an impactful climate policy (as recently emphasised at the COP29 in Baku by the Prime Minister). In this context, imports of carbon-intensive goods and free allowances under the UK Emissions Trading Scheme (ETS) could be potential barriers.

Without policies to manage the carbon emissions embedded in imports, there's a risk of "carbon leakage" — where domestic emissions decrease, but are offset by emissions in other countries that produce and export carbon-intensive goods to the UK. These imports can unfairly compete with UK-produced goods that are subject to stricter emissions regulations, potentially disincentivising domestic production of low-carbon alternatives, which in turn, impacts jobs and competitiveness. This issue highlights the need for a holistic approach that addresses both local production emissions and the embedded carbon in imported goods. Along with the ETS that addresses domestic emissions, the UK Government announced the introduction of Carbon Border Adjustment Mechanism (CBAM) from 2027 on regulated emissions in imports. However, the UK CBAM will initially cover only some products (iron, steel, cement, fertilisers, aluminium, and hydrogen). This limited scope may leave gaps, as many subsectors within the clean energy industry will face competitive disadvantages.

Additionally, free allowances under the UK ETS impact the clean energy sector's competitiveness by partially insulating high-emission industries from the true cost of carbon. Initially designed to prevent carbon leakage and support domestic industries against international competition, these allowances can inadvertently prolong carbon-intensive production and slow the shift to greener practices, putting the country at a disadvantage. To mitigate this, the UK could set a clear path to gradually phase out free allowances for industries with viable low-carbon alternatives alongside the CBAM rollout. This combined strategy would encourage both domestic and international suppliers to adopt cleaner practices, fostering a level playing field for low-carbon goods in the UK and supporting the country's clean energy goals in a more effective manner while sustaining growth.

Aligning the UK's CBAM and ETS with the EU framework could facilitate smoother implementation and strengthen climate policy, fostering cleaner energy development. Without such alignment, the UK risks facing significant challenges, including difficulties in data collection, emission verification, and navigating legal complexities. These hurdles could undermine the effectiveness of the UK CBAM and impede progress on clean energy infrastructure.

Answering this question from a trade perspective, there are several barriers that the UK government may want to review, also as part of a trade policy strategy. Several businesses have repeatedly pointed out the bureaucratic burdens they face and the lack of guidance and information when it comes to trade with the EU – an issue particularly acute for SMEs. Similarly, restrictions on mobility of workers for business purposes and regulatory differences between the UK and the EU (also see answer to question 19) feature prominently among the barriers that firms face. On the other hand, free trade agreements and mini-deals provide key enablers and could be a way forward especially for specific issues such as technological cooperation, digital technologies, and critical minerals (also see answer to question 24).

<u>Recommendations:</u>

6.1 Establish a clear timeline to gradually eliminate free allowances under the UK ETS for industries with viable low-carbon alternatives, coupled with incentives for cleaner production methods, to drive decarbonisation while maintaining competitiveness.

6.2 Align the UK CBAM and ETS with the EU Framework to strengthen climate policy, promoting cleaner energy infrastructure.

6.3 Address trade barriers through (targeted) trade agreements, prioritising regulatory misalignment and sector-specific needs.

6.4 In the future, expand the scope of the UK CBAM to cover a wider range of products, ensuring that low-carbon domestic producers are not disadvantaged by carbon-intensive imports.

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?*

It is worth emphasising an important consideration that applies generally to investment decisions (and not only). Investment plans often span several years and uncertainty is a

major deterrent. Data on UK industrial investment after 2016 strongly suggests a major fall caused by the uncertainty generated by Brexit at the macro and micro level. This is because of a lack of clarity on the path to deciding rules regarding market access into the EU (and the associated border friction costs) and the nature of the British regulatory environment that would have followed (see, for example, https://blogs.sussex.ac.uk/uktpo/2020/02/14/export-platform-fdi-and-brexit-uncertainty/). Similarly, evidence from the creation of the single market in the 1980s suggests that the unpredictability of border costs was more of a deterrent to investment than the expected level.

Relatedly, dynamic alignment of regulations with the EU will have a limited automatic effect on EU market access if not backed by a binding commitment. Again, the certainty of compliance is necessary to allow firms to plan and invest accordingly without facing the risk of non-compliance. It follows that this requires some form of reciprocal enforceable agreement with the EU. In this way, certainty both in the UK and the EU would provide firms with the best conditions to invest.

Recommendation:

7.1 Establish a binding regulatory alignment agreement with the EU to ensure dynamic regulatory alignment, providing long-term certainty on market access and compliance, which is crucial for fostering industrial investment and economic stability.

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?*
9. *What more could be done to achieve a step change in employer investment in training in the growth-driving sectors?*
10. *Where you identified barriers in response to Question 7 which relate to RDI and technology adoption and diffusion, what UK government policy solutions could best address these?*
11. *What are the barriers to R&D commercialisation that the UK government should be considering?*
12. *How can the UK government best use data to support the delivery of the Industrial Strategy?*
13. *What challenges or barriers to sharing or accessing data could the UK government remove to help improve business operations and decision making?*

This question can be addressed from different perspectives, depending on the meaning and interpretation given to "data". Thus, three answers are provided below.

First answer (interpreting data as an input for businesses):

Access to large data is increasingly important for the competitiveness of businesses. Data analysis can provide insights into production, customer behaviour, market trends, and drive innovation and growth. However, UK businesses face infrastructural and regulatory barriers

that restrict their ability to leverage data to their full potential to gain a competitive advantage:

- Digital infrastructure: storing and processing of data has become more complicated and costly, due to the ever-increasing size of data and computing power requirements. To address these challenges, businesses have resorted to outsourcing and offshoring such processes to data centres and cloud service providers. Therefore, the presence (or lack thereof) of data and cloud centres impacts access to large data. Also, their geography within as well as across countries is particularly important, as data transfer speed and latency decline with distance. Papadakis and Savona ("The Uneven Geography of Digital Infrastructure: Does It Matter?", CITP Briefing Paper 16, 2024) find that while the UK ranks third globally in terms of data and cloud centres and is a top exporter of digital services, it has a relatively low number of data and cloud centres after accounting for its size. However, the same research points out important trade-offs when considering policies aimed at increasing such infrastructures. In fact, data centres are known to be highly water and energy intensive (for cooling mechanisms) and a detailed study on their net environmental footprint would be important. Furthermore, the actual impact of data centers on employment and productivity is uncertain.
- Data regulations: data regulations slow down technological change when it is taking place too fast, or the labour market is not ready. They aim to protect personal data and set standards that need to be met for a country to qualify as "adequate" to maintain the free flow of data with it (the EU in the case of the GDPR). Yet, data regulations, such as the GDPR, can be costly for firms, reduce access to data and slow down innovation.

Moreover, addressing the dominance of a few global firms in data centre ownership is also key to lowering barriers to data access for UK businesses. Currently, three US companies control over 70% of data centres worldwide, leading to market concentration that affects data accessibility and cost. This concentration not only raises operational costs for businesses that rely on data and cloud centres, but also makes UK data policies susceptible to geopolitics that favour the interests of large US-based businesses. For these reasons, the UK needs policies that alleviate these barriers to maintain its competitiveness although they must be assessed against a wide range of related considerations (e.g., environment, employment).

Freeports (see also answer to question 27) could help make the UK a more attractive location for data and cloud centres and encourage data-driven innovation in economically disadvantaged areas. While capital allowances and tax reliefs on imported (tangible capital) inputs are already in place and encourage capital investment and technology transfers, there is a lack of similar policies for data (intangible capital). Gans (2024) argues that testing AI and data-driven technologies in controlled settings can accelerate the learning of potential societal effects, allowing policymakers to adapt regulations responsibly. At present Freeport regulations actually offer very limited incentives to attract datacentres and only apply in customs and tax sites. To have a big impact there would need to be major changes to these rules to allow exemption from data regulations for research and experimentation in

Freeports and policies aimed at establishing links with local higher education institutions and encouraging on-the-job training, as cloud and data centres require advanced human capital.

Recommendations:

13.1 Encourage sustainable data infrastructure expansion within the UK, supported by research to evaluate their net benefits, including environmental and economic impacts, to enhance data access while addressing resource concerns.
13.2 Evaluate the case for changing Freeport policies with the aim of encouraging the establishment of data and cloud centres

Second answer (interpreting data as the basis for intellectual property rights):

When financial resources are limited, it is tempting to seek to incentivise investments in R&D by strengthening intellectual property rights, in particular if a new type of good or service is created that is not covered by existing regulations. Such a temptation should be weighed up against its costs. In fact, strong patent and copyright rules can create barriers to incremental innovation.

With data becoming a key intangible asset, key competition issues must be addressed: how to trade off the avoidance of allowing the monopolising of existing data sets to create market power versus the risk of open access for tech giants to others' data creating an eventual new networked market power (see ongoing case again Google in the United States).

Recommendation:

13.3 Establish policies that prevent monopolisation of data while avoiding unrestricted access that could reinforce dominance by tech giants, ensuring fair competition and innovation in data-driven industries.

Third answer (interpreting data as the basis for analysis):

From the perspective of knowledge creation, access to data is crucial to contribute to the design, follow-up and feedback to any government policy. In terms of international trade and trade policy, two areas closely interlinked with industrial policy, researchers aim to address several questions related to the performance and response of firms to trade shocks or changes in trade policy. Firms are the actual agents engaged in trade, and which are the final targets and key actors of any industrial strategy.

However, access to firm-level trade data for research purposes in the UK has proven to be extremely difficult. As a result, many interesting research projects are not pursued which discourages research and the ability to effectively assess whether and how policy decisions may affect businesses' performance and their decision-making. In comparison, firm-level datasets can be more easily accessed in other countries (e.g., Belgium, France) providing important feedback to their government and more generally to learn about firms' (international) strategies. Recently, HMRC transaction-level data has been made available through the ONS, in a dataset called TIG-IDBR, which merges trade in goods data with

firm-level information from IDBR. While this is a welcomed development, this new dataset does not allow the study of many important questions because transactions are aggregated at the product-country-time level and many HMRC trade variables are excluded. Furthermore, access to this dataset is still highly restrictive.

Recommendation:

13.4 Improve access to UK firm transactions-level trade data for researchers in a timely and comprehensive way, and allow them to be linked to other ONS datasets. This would allow a deeper understanding of how UK firms adjust to global challenges and to any policy change (in the UK or elsewhere), thus providing valuable information to policymakers.

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?*
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*
16. *What are the barriers to competitive industrial activity and increased electrification, beyond those set out in response to the UK government's recent Call for Evidence on industrial electrification?*
17. *What examples of international best practice to support businesses on energy, for example Purchase Power Agreements, would you recommend to increase investment and growth?*
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?*
19. *How can regulatory and competition institutions best drive market dynamism to boost economic activity and growth?*

A crucial consideration for a successful Industrial Strategy is to ensure that the policy institutions work in a coordinated manner with clear and consistent policy objectives. This is an issue that was widely debated when Industrial policy was last in fashion, and was recently highlighted in the Draghi Report (and noted in the commentaries that followed).

As Draghi argues, competition policy is probably the most valuable tool of industrial policy when financial resources are limited and trade policy is circumscribed by international rules. Competition policy needs to be directed towards efficiency and be politically independent. Industrial policy inevitably reflects political priorities, sometimes due to regional or "security" considerations, but sometimes due to capture or simply information asymmetries between firms and the government. Similarly, trade policy must follow international rules and to a great extent, be decided and evaluated on its economic, not political, merits. At the same time, trade defence instruments (e.g., antidumping) are explicitly designed to be protectionist and are prone to be politicised even when a supposedly independent body, such as the Trade Remedies Authority, is established. Thus, objectives are often in

contradiction and evidence (e.g., overruling of a recommendation from the Trade Remedies Authority) suggests that "rule-based" regulatory agencies cannot alone sustain the burden of the trade-offs needed to support a successful industrial strategy. Unfortunately, there is no easy answer to this dilemma. At a minimum, transparency is an absolute necessity – but Industrial Strategy is inherently problematic.

In this context, it is also worth noting the importance of further promoting Regulatory Cooperation with EU agencies, as provided for by the Trade and Cooperation Agreement. This represents an opportunity that has not been fully leveraged. One key venue is UK membership of the European standards bodies, and additionally also in the work of the European Accreditation group. This could be a first step towards an eventual agreement on Mutual Recognition of Conformity Assessment, by providing an institutionalised entry point into the European regulatory infrastructure. Institutionalising dynamic regulatory alignment with the EU could potentially lead to certainty of market access – see also answer to question 7).

Whilst consultative regulatory cooperation with the United States is, in principle, also advisable, it is worth noting that alignment with the US would hinder the realisation of benefits from dynamic regulatory alignment with the EU, which is a larger trade partner for the UK. It would also be more difficult to achieve since our system of standards/regulation/conformity assessment/accreditation is structured along the same lines as the rest of Europe. Given the results of the recent Presidential elections in the US, the uncertainty about the new administration position on regulation would further hamper alignment and credible commitment from the US side.

<u>Recommendations:</u>

19.1 Create a transparent mechanism for reconciling conflicting objectives of competition, trade, and industrial policy, acknowledging that there is a limit to the effectiveness of a rule-based system to some unforeseen situations.

19.2 Foster and prioritise regulatory cooperation with the EU, especially in the area of standards, being ready to make credible commitments to achieve full reciprocity.

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?

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)?

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?

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?

The UK government's efforts to support growth through financial instruments such as those mentioned above is important. To complement them, trade credit could be an additional tool to encourage strategic investment, particularly for manufacturing firms. Industrial policy and international trade are deeply interconnected. By increasing access to international markets, trade expands the potential customer base for firms, effectively growing the market and enhancing firms' selling potential. However, many firms—especially small and medium-sized enterprises (SMEs)—face barriers to entering export markets, including the upfront costs of production and the risks associated with delayed payments from international buyers.

Trade credit, which provides firms with the financial flexibility to cover production and operational costs while awaiting payment from buyers, can address these challenges. In areas where trade credit has been promoted, such as through government-backed schemes or partnerships with financial institutions, it has been shown to achieve significant results in encouraging export activities (by reducing liquidity constraints, firms are more likely to consider exporting as a viable option), supporting market expansion (by facilitating market entry and scaling, as firms can manage larger orders and payment cycles more effectively), and promoting competitiveness (by allowing producers to offer competitive payment terms to buyers, enhancing their attractiveness in global markets). Thus, implementing trade credit as part of the UK government's financial toolkit could incentivise firms to expand into international markets, fostering both growth and strategic investment.

<u>Recommendation:</u>

23.1 Integrate trade credit into financial support mechanisms, addressing liquidity constraints and mitigating payment risks. This would empower firms, particularly SMEs, to enter export markets confidently, manage upfront costs, and scale operations effectively.

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

Considering the relationship between international partnerships and trade, two critical issues need to be recognised. First is how to navigate the UK trade landscape at a time of significant government intervention in many counties. Furthermore, in trying to reshore the manufacturing sector back to the US, the coming US Trump administration, from January 2025, is expected to introduce high tariffs even to its traditional allies (including the UK). Under these circumstances, it is likely that the UK will face challenges in promoting exports through reducing market barriers and attracting inward investment. How the UK itself can promote industrial policy while maintaining the principle of open and liberal trade is the second challenge. Although the Green Paper has not explicitly revealed the types of industrial policy measures to be implemented, typical measures that highly developed countries are currently using, such as corporate subsidies, are trade-distorting instruments. Awareness of the trade distortive effects of industrial measures is paramount, to be able to maintain stable international partnerships.

To promote industrial policy with economic security and resilience objective, a soft-law approach is advisable as geopolitical and technological factors constantly change. The competitive advantage of UK industries from upstream to downstream in global supply chains has to be well examined to identify subsectors and key materials that require special partnership arrangements with potential partners. Existing free trade agreements (FTAs) do not aim to promote partnerships for economic security and resilience goals, but they could be used to leverage these objectives. Similarly, FTAs can be a major tool for economic growth. Since most of the eight growth-driving sectors proposed in the Green Paper are not explicitly addressed under current FTAs. New initiatives, such as creating an Annex on advanced manufacturing, or one on digital trade, will be needed – see also answer to question 6). Regulatory dialogues, such as the promotion of Mutual Recognition Agreements (MRAs) can be started within FTA frameworks with full engagement of regulatory authorities and businesses on both sides.

Focusing on a specific sector, the Green Paper mentions the role of international partnerships to boost resilience in critical mineral supply chains (p. 44). Indeed, international trade and investment agreements (binding legal tools) and partnership arrangements (typically non-binding tools) can play an important role in ensuring that the UK has access to critical minerals supply chains. The Strategy also highlights the UK's plans to develop domestic EV battery manufacturing capacity, for which it will need access to critical mineral supplies. Therefore, the UK's industrial strategy on critical minerals needs to be both inward and outward looking; in both cases, trade policy can play an important role in shaping government decisions. In the case of *inward-looking strategy,* to boost domestic manufacturing of goods that use critical minerals as inputs (such as batteries), the UK will need to be careful not to breach any World Trade Organization obligations on subsidies. However, to encourage such domestic industries, the UK must access minerals by leveraging trade and investment agreements/partnerships, as part of its *outward-looking strategy*. Such partnerships have gained global popularity amongst similar resource-hungry countries as tools to secure supply chains.

Critical minerals partnerships with resource-rich countries form part of a government's outward-looking industrial strategy by which both countries make political commitments to keep open supply chains, encourage value chain integration, explore joint investment opportunities that can help add economic value in resource-rich countries, and uphold strong ESG standards. International collaborations can help the UK achieve multiple objectives. These include striking firm-level deals with mining and processing companies, particularly in resource-rich African economies, and entering joint ventures with local firms to overcome entry barriers and foster trust. Agreements should reflect supply chain priorities for different critical minerals. Collaborations with resource-rich partners can address economic development and sustainability concerns, even where value addition is unfeasible, while exploring alternative support options. The UK should also work with these partners to set and adopt ESG standards for responsible supply chains and collaborate with other resource-hungry nations on joint investments in saturated markets. At the same time, the UK could rely on its world-beating professional service sector to its own advantage. Resource abundant lower income countries might benefit from technology and knowledge

transfer through the supply of professional services. From an perspective of industrial policy for inclusive trade, supporting trade specialisation in business services specialised for such countries could enhance local capabilities in the countries.

To maximize the success of international collaborations, the UK could fund companies to invest in resource-rich countries, ensuring mutually beneficial agreements. In a competitive resource market, offering attractive terms will be crucial for UK firms. The UK could establish a fund to incentivise mining investments, with financing tied to ESG compliance and impact disclosures, alongside technical support for exploration. Transparency in commitments with other states or firms is essential, as non-binding partnerships, though not subject to parliamentary scrutiny, may have economic consequences and affect the acceptance of sustainable supply chains.

Recommendations:

24.1 Devise international partnerships explicitly addressing the objectives of economic growth, economic security and resilience. Such an objective-based approach enables a substantially meaningful agreement with a targeted partner. FTAs should be part of these partnerships.

24.2 Evaluate the successes of international partnerships being pursued globally and assess what improvements could be made. For example, in the case of critical minerals, the UK should actively consider ways to make itself an attractive partner to resource-rich countries, in turn highlighting the need to supplement its outward strategy with an inward strategy.

24.3 Make transparency a key principle when signing non-binding partnerships because of their economic implications.

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

The eight sectors chosen to be prioritised by the industrial strategy differ substantially, and not only because of the service versus manufacturing distinction, making it difficult to offer generic answers. More generally, identifying which international markets firms can target is inherently challenging due to the highly specialised nature of global value chains (GVCs). In today's interconnected world, firms tend to concentrate on specific segments (if not even specific products) within a sector. In fact, research has shown that the increasing fragmentation of production across borders has led to a rise in specialisation, with firms focusing on niche capabilities.

This strategy makes it difficult to pinpoint potential markets without a clear understanding of where a firm fits within the global value chain. This requires a flexible and adaptable approach. This is all the more relevant due to the current geopolitical landscape where shifting trade policies, political instability, and regional tensions can rapidly alter the dynamics of supply chains.

Given this complexity, one indicator cannot in itself provide an answer and a range of indicators should be used, as argued already in the answer to question 1 and evidenced by

the UKTPO Briefing Paper 71 (https://blogs.sussex.ac.uk/uktpo/files/2022/12/BP71v2.pdf). Among these, measures of revealed comparative advantage (at sub-sector and product level) over time and their decomposition, together with evidence on the recent worldwide-level performance of such segments would be the starting point (and see answer to question 1 for which other indicators to use). In the face of such a difficult task, and consistent with the evidence on the costs of entering and maintaining a presence in international markets, the government could adopt policies that are flexible and adaptable. In particular, actions to lower firms' internationalisation costs would be the most flexible, especially when targeting SMEs that are most sensitive to such costs (and the ones that stand the most to gain from further internationalisation). Among the many dimensions of such policies and focusing specifically on the aspect of support, it is worth mentioning export promotion, export credit and financing, education and training.

Recommendations:

25.1 The recommendations provided for question 1 apply here as well.

25.2 Introduce flexible policies aimed at lowering the costs of internationalisation, especially for SMEs.

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?

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 Green Paper Strategy emphasises the value of existing industrial clusters, which are often linked to universities that provide skilled graduates, embedded in the Investment Zone programme. This seems to indicate that regional industrial strategy is to be built on existing or nascent strengths, rather than seeking to offset regional inequalities. Research suggests that absorptive capacity is a crucial element in the success of regional investment support, especially when innovation-based. Availability of a high skilled workforce, infrastructure (transportation and energy) are a pre-condition for success, as they would not be necessarily the result of subsidies. Ireland is the classic example where high-skill labour and appropriate incentives were already available and spurred growth when R&D funding from the European Union was injected in the system.

One small but relevant question in this context is the role of Freeports (not explicitly mentioned in the Green paper but in the political debate recently – see also first answer to question 13) play in the new Industrial Strategy? In this regard, clear distinctions must be made between Investment Zones, Freeports, and Customs and Tax Sites within Freeports.

At the moment, the location of Freeports is only loosely related to clusters and the Customs Site effects are likely to be negligible and not linked to advanced industrial activity. Overall, the scale of the funding involved is small and unlikely to result in significant growth effects. On the other hand, the incentives available in the Tax Sites have been linked to some pre-existing "green" activity, especially in Scotland, which can be tied in with the government

climate policy, including wind turbines, CCS, and green hydrogen. However, it is necessary to clarify how far the value support for these sectors is increased or reduced by prioritising activity undertaken in a Freeport.

Recommendation:

27.1 Scale down investment in the "Customs Site" aspect of Freeports and carefully evaluate absorptive capacity in place-based programmes.