

Response ID ANON-TP8E-9BZ7-D

Submitted to **Building our Industrial Strategy**

Submitted on **2017-04-11 13:26:45**

About you

Name

Name:

Dr John Lincoln

Email address

Are you happy to be contacted if we have any questions about your response?

Yes

Are you happy for your response to be published?

Yes

Comments:

Postcode

Are you answering on behalf of:

an organisation (in an official capacity)

About you - organisations

What is the name of your organisation?

Name:

Photonics Leadership Group

Approximately how many employees are there in your organisation?

Not Answered

What type of organisation is it?

Voluntary sector

Voluntary sector

What type of voluntary sector organisation is this?

Voluntary organisation

Other (please describe):

Industrial Leadership Council, A voluntary industry led body, representing 1500 UK photonics organisations, employing total of ~70,000 people manufacturing products enabled by light based technology

Responding to this consultation

Introduction

1 Does this document identify the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?

Free text field:

Yes

2 Are the 10 pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?

Free text field:

Broadly yes, although some refinement within the pillars is required as noted in responses that follow

3 Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here the right ones?

Free text field:

Whilst the principle national institutions are in place, the creation of UKRI is a major development. UKRI certainly has the opportunity to improve end-to-end innovation support in the UK, strengthen synergies between the research and innovation support and accelerate the adoption of technology by industry. However, the Research Councils and Innovate UK have very different structures and levels of industrial/technical experience. Putting them under one umbrella organisation alone will not break down adoption barriers and UKRI will need to focus resources on bringing the organisational cultures together so they strengthen each other and deliver results for UK industry. It is also important that there is some independence to allow both blue sky research and support of innovation emerging from industry independent of the research base.

The loss of the manufacturing advisory service leaves a hole thereby limiting the spreading of best practice within manufacturing.

The increased emphasis on local clusters correctly identifies that each sector and area is different. The strategy should further recognise that sectors differ greatly in their degree of regional focus. Indeed, there are many sectors, including the heavily export-focused photonics industry (and the aerospace and automotive sectors already identified in the strategy), whose global outlook means they do not see regional boundaries. Such globally focused industries are vital to the UK economy, and provide highly productive jobs distributed throughout country. Yet these industries are not clustered in just one regional area and can be missed by excessive focus on regional clustering.

The role and importance of supporting vibrant national focused industry-led sector groups as well as regional ones should be explicitly included in the strategy. A streamlined mechanism for working with the complete LEP community is also required, to avoid the inefficiencies of such distributed sectors having to liaise with each LEP individually.

4 Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these 10 pillars?

Free text field:

Germany has successfully created a joint public privately funded seed stage investment fund -High-Tech Gründerfonds www.high-tech-gruenderfonds.de. This fund has been instrumental in accelerating early stage investment in Germany, with 468 investments over 10 years. Critically this fund appears to have overcome the regulatory barriers to operating a joint public and private investment fund in the open market alongside pure private investment funds. It is a model that could be highly beneficial to the UK and may be constructed to have a regional structure thus supporting capital investments outside the London area.

Investing in science, research and innovation

5 What should be the priority areas for science, research and innovation investment?

Free text field:

Greater focus should be given to technologies that enable and underpin productivity in a broad range of manufacturing and service sectors. Enabling technologies, such as photonics, electronics and embedded software are vital to keeping all manufacturing and service industries competitive and improving their productivity. Backing these enabling sectors avoids 'picking winner' applications and, through diversity of impact, reduces risk on the government receiving return on its investment and dependency on any single market. For example, backing next generation sensors has impact from security to autonomous vehicles, to farming and food manufacture.

Enabling tech is often hidden from view, embedded within products and processes making it less glamorous and because it requires more detailed technical knowledge to evaluate its impact, attracts less private investment. Yet such hidden tech is responsible for a high proportion of the value in end products and frequently enables new services and business models. Government investment should take the long view to understand the impact of enabling tech and balance investment in enabling innovation and consumer facing applications.

The government should invest in such hidden enabling technologies to ensure a high value UK supply chain that can be accessed by a broad range of end industries. Reliance of pull through from end users alone is insufficient when those enabling technologies are not engineered to a mature enough stage for end users to be able to fully assess how they can be integrated into their product/process (cost, risk, performance impact in field). Without balancing investment in enabling innovation and end applications, the UK risks further hollowing out of supply chains and being dependent on sourcing the key technologies that enable the next generation of the digital revolution in both manufacturing and services from outside the UK.

Additionally, in setting priorities, the industrial strategy needs to fully embrace new digital and service business models where the traditional link between technology innovator, hardware sales and service income in a single organisation is broken. Some of the most innovative companies of our age are dependent on hardware developed, manufactured and operated by others. Developing and manufacturing hardware may be less glamorous, but the service sector would not exist and will not be able to expand without it.

6 Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?

Free text field:

Challenges should either focus on high level end market challenges, e.g. ubiquitous high bandwidth digital connectivity, or wide impact enabling technology challenges e.g. 3D printing of X volume of material an hour, but should not mix the two. Great care should be taken to avoid specifying how a challenge is solved, or which technologies should be used. Hybrid and mixed technology solutions should be encouraged with a mix of risk, including high risk, high gain solutions.

Only in this way will the most innovative and disruptive radical solutions emerge.

The government should consult industry widely on what the key challenges are and be open to all suggestions, regardless of fit to previous policy initiatives. Forcing challenges into previous boxes without being open minded, risks funding more of the same, and/or netting only incremental improvements.

Suitable challenges include:-

- Raise productivity of 3d printing to xcm3/hour in metals and plastics so it can be cost effectively deployed in manufacturing (expert guidance should be sort to define x)
- Develop fail-safe autonomous driving sensors and control systems. Criticality this separates the high value control system/ sensor development from the actual vehicle (car, bus, lorry etc) on which it can be deployed.
- Cost effective self-contained pre-clinical over-the-counter health diagnostic and treatment solutions with methods to rapid adoption across the NHS / UK market. Focus on such innovation has potential to drastically reduce the load on the NHS at source. Few people consult their doctor for a pregnancy test, the same should be true for many more health conditions. Innovation in approvals and market access also is required alongside technical innovation e.g NICE equivalent is required to approve such equipment.
- Incubator/ demonstrator for next generation high security low latency high speed data centres and associated hardware to support and anchor in UK the highest value digital service sectors, e.g finance, security, remote healthcare.
- Lightweight flexible camera/imaging systems capable of recording and identifying objects and their composition remotely including full supply chain development for healthcare, security, safety defence and productive manufacturing.

7 What else can the UK do to create an environment that supports the commercialisation of ideas?

Free text field:

The strategy correctly identifies a need to review best practise in university spin-outs, in particularly the size of equity stakes. This review should include not just the stake taken by the university and investor, but also the provision of equity for the business entrepreneurs that must be attracted into a spin-out to take it forward. It is widely recognised that invention is only the start of the innovation processes, and the majority of the effort, risk and funding is in taking that invention through productisation to market. Doing this efficiently requires attracting experienced entrepreneurs. Given that reducing cash burn is an imperative for any pre-revenue company, equity and goodwill are the only commodities available to attract such entrepreneurs. Yet too often university spin-outs end up with a structure that gives insufficient equity to attract an experienced early stage management team.

The parameters primarily determining academic career progression- high impact publications- are generally at odds with those of encouraging commercialisation. Commercialisation, whether by spin-out, licence or improving the engineering maturity of an invention takes time effort and resources. To do so reduces the chances of high impact publication and thus career progression within academia. Indeed, given that such publications are associated with first demonstration (e.g TRL1), optimising the number of high impact publications is a direct contradiction to pushing an invention through to commercialisation. Impact is now a welcome part of the research assessment exercise, but this alone is insufficient to increase emphasis on commercialisation. An academic's commercialisation activities should be given greater weight in their career progress – a start would be to recognise award of a patent, or an industrial contract of substantial value, as having equivalent status to the highest impact journal publication. Such initiatives should not overshadow academic excellence, but create greater parity between furthering the intellectual and economic development of the nation, without implying either superior to the other.

The strategy correctly identifies the excellence of the UK's science base. Industry acknowledge this, yet frequently suggests that the results of university research are insufficiently mature to evaluate the commercial potential of a new technology. From an industry view point, research stops too soon, from an academic view research excellence has been delivered and credited through peer review and further development may be beyond their expertise. Innovate UK funding requires matched company funding and thus is only relevant once a company is able to understand the impact of a new technology. Commercialisation of university research would therefore be accelerated if there was expansion in funding available to support the further engineering of research, to a level where industry is able to understand its impact. Impact acceleration funds/ accounts are a start in the correct direction, but this area would be well suited to consolidation and a more structured approach under UKRI bridging, as it does, the gap between Research Council funding and Innovate UK funding. When doing so, it should be recognised that engineering development is a distinct, and often separate skill from initial research and funds should enable access to such engineers rather than restricted to channelling additional support to initial researchers.

8 How can we best support the next generation of research leaders and entrepreneurs?

Free text field:

As noted above career progression with research should recognise significant commercialisation activity as equivalent to high impact publication. As noted this should not deter pursuit of academic excellence and training, but should also not penalise those who sacrifice publication opportunities to find commercial relevance for their research.

Spin-out equity models need to leave sufficient equity available to attract experienced entrepreneurs to the early stage management of a spin-out at a level that is at least the same as the academic founders.

The UK needs to create pride in its engineers, scientist and technology researchers with a sustained program of careers promotion, which does not necessarily mean through managerial or financial roles. High value manufacturing is a precision business and rarely the grimy greasy cliché often portrayed in the media. Old stereotypes need to be broken down with particular focus given to supporting school career advisors who have a pivotal role in expanding the career aspirations of the next generation.

9 How can we best support research and innovation strengths in local areas?

Free text field:

First a balance is required between supporting local and national strengths and understanding companies can have differing views of what local means. Globally focused export industries, such as photonics, are often focused more on international markets than on immediate local area, certainly as a source of customers. To maintain their global competitiveness, they will often seek to access innovation across UK and internationally. From an innovation/ product development view point, local, to such organisations, can often mean anywhere inside the UK.

However, individuals can be more locally focused and the high transaction costs of moving house means the local area remains, and is possibly an increasingly, important source of staffing and recruitment. Therefore a strategy that gives at least equal weight to interaction with local research centres as source of future employees as much as a source of innovation would potentially have greater impact. Such a balanced focus can change who within an company the research base targets for engagement, with operational and HR staff of equal importance as engaging engineers in innovation

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Developing skills

10 What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?

Free text field:

comment provided within following question responses

11 Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons we can learn from other countries systems?

Free text field:

The increased emphasis on producing a quality technical education system is very welcome, especially the development of more structured progress through more advanced courses/qualification. It should be recognised that one potential impact of this (and possible cause of previous proliferation of low level course) is that not all further education colleges will be able or should offer the same courses. Specialisation, especially at more advanced levels, is to be expected and encouraged. Better a quality well subscribed course at a small number of colleges than ubiquitous mediocrity.

One implication of this is that further education colleges will need to expand what they see as their catchment area for both intake and business engagement. Measures, such as the suggested unified application process and access to maintenance support, will also be needed to make students more mobile and aware of courses further afield especially as they advance in their training.

12 How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?

Free text field:

As noted above greater technical training progression implies greater specialisation by colleges at the more advanced training levels. This will require enabling student mobility at the technical education level for >18 year olds of the type commonly seen at present in higher education. Young people are mostly free of the obligations of home ownership and supporting a family that often restrict mobility. Such mobility also helps spread skills around the country. The higher education sector is already seeing more students return home after qualification to start work (an impact of the cost of housing), the same can be expected in advanced technical qualifications.

Key to enabling such mobility is awareness of the courses offered outside the immediate local area and linking these to potential local careers they can pursue assuming they are likely to return.

13 What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?

Free text field:

Advanced high value manufacturing is a precision, clean, frequently digital enabled process. The skills required bear more resemblance to fine crafts such as jewellery design and fabrication, or computer gaming and intuitive use of mobile devices, than they do to metal bashing. Advanced manufacturing is not about strength, but combining fine skills, situational awareness, and digital interfaces and multitasking. Too often education institutes try to pigeon hole skills into either the machine shop or the computer room. The reality needed by industry is a hybrid combined with an eye for detail.

Much greater emphasis is needed on training and promotion of the required skills in clean hi-tech manufacturing. Links can be made between creative interests and manufacturing careers. Positioned correctly advanced manufacturing courses should attract a uniform gender balance and appeal to a much wider proportion of young people than traditional 'heavy' manufacturing. This is no more obviously so than in photonics where optical fibres and laser chips are often the core components.

Training for advanced manufacturing should prepare people for roles which are increasingly mentally rather than physical tiring. Digital manufacturing means the separation between shop floor and office in a modern factory will increasingly be blurred. Roles will be continually changing and adaptability is vital. Training needs to prepare people for a career journey, with re-taskable skills, not a single job function.

14 How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?

Free text field:

New and high growth industries, such as photonics, benefit hugely from inward transfer of those with experience in more established industries. A great many skills from HR, finance, operations quality control and manufacturing engineering are required as companies scale-up. Sustained rapid growth means companies go from modest niche producers to high volume OEM suppliers quickly. However, photonics and other hidden enabling tech sectors, can find it difficult to attract

those non-technical specialists, or even those without specialist skills who have never heard of the industry or its impact. People who have worked for a large, often slower growth firm, can be cautious of moving to a high growth industry, about which they know little, and who may have little familiarity with applying their skills despite recognising the need.

Measures are required to promote mobility into the enabling tech sector, to raise awareness of the real and positive impact and great prospects careers in such sectors have. Enabling such transfer is critical to enabling the growth of small companies to high performing mid-size companies so often identified as driving the German economy.

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Upgrading infrastructure

Call for evidence on UK infrastructure policy

15 Are there further actions we could take to support private investment in infrastructure?

Free text field:

Digital infrastructure is unusual in that those who benefit the most in the services sector are often remote or removed from the hardware investment. This is most apparent in the financial sector where, for example, a >\$100bn worth of stocks are digitally traded on the London Stock exchange monthly. The financial services sector, which could not exist without digital connectivity, should be actively encouraged to invest not just in deployment of current generation technology, but most importantly in the development of next generation communications technology in the UK.

Supporting and adopting next generation communication tech in the UK could provide huge returns to the financial services sector yet at the present they invest almost nothing in its development. Action is needed to make high value services sectors, especially financial services, aware of how much they have to benefit (or lose) if they do not invest in the next generation on digital infrastructure development.

16 How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?

Free text field:

The strategy correctly identifies the importance of developing a globally competitive digital infrastructure. However, investment in local fibre broadband roll out and 5G technology must be matched and balanced with investment in the core optical communications network in the UK.

Excessive focus on access without expanding the core network is analogous to expanding local roads without investing in the motorway network, except in the digital world almost all traffic ends up on the core 'motorway' network. Careful balance and co-investment is needed to ensure improvements in the access network are not throttled by lack of capacity in the core network.

We welcome that the industrial strategy green paper highlights the need for a more effective connection of regional transport infrastructure with national one, to shorten time of travel. Hopefully, not just focussed on the North of England and the Midlands, including other areas in UK that are not well connected, such as the South West of England. This will help high tech companies to expand their reach and to benefit from expertise in areas that a further afield which would benefit innovation, especially in an enabling and fast growing sector such as photonics. Decentralisation of the national network would also help, such that people do not have to travel via London to cross the country.

17 What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?

Free text field:

The optical fibre network is the heart of the UK digital infrastructure, delivering data across the country, globe and increasingly direct to the home, business and 4G/5G base station. The skills needed to maintain and expand the fibre network are very similar to the skills needed to expand a modern datacentre and manufacture optical fibre components for both communications and industrial laser processing applications – albeit precision joining of optical fibre in a wet muddy field is slightly more taxing. Thus investment in more precision manufacturing skills, especially around working with optical fibre, will benefit both infrastructure and manufacturing industry

Much traditional infrastructure (roads, rail, power, water) relies on advanced technologies to secure the infrastructure, monitor its integrity and optimise its build/implementation. The non-invasive nature of photonics, from cameras for optical sensors, means it has a critical role to play in optimising infrastructure performance. There is significant expertise in the UK in these areas and policies that allocate contracts that include preferential use of UK products would be welcomed. That, combined with an expanded SBRI programme would help UK companies to develop innovative new products addressing the needs of infrastructure sector and would allow the companies to remain competitive in a global market.

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Supporting businesses to start and grow

18 What are the most important causes of lower rates of fixed capital investment in the UK compared to other countries, and how can this be addressed?

Free text field:

As has been commonly observed in previous analysis, the shortage in the UK of family-owned mid-sized companies, which are common in Germany, is associated with a shorter investment horizon. Whilst this has been previously well documented, the underlying cause is worthy of analysis.

The UK's open flexible business environment makes it attractive for foreign firms to invest in high growth UK companies (illustrated by our success in inward investment). This makes external investment the easiest route for many small companies to raise the capital they need to grow, especially when bank loan finance for capital investments has been difficult to obtain. Given that the flexible business environment is something the UK leads Europe and many places in world on, and is something we wish to maintain, the resulting lack of mid-sized companies maybe a natural result.

Focus therefore should be on enabling more UK companies to be the purchaser rather than the purchased, which is not dissimilar to encouraging fixed capital investment, except perhaps in scale and the more direct role of investors. The more long term investors are the better. Solutions therefore need to focus on influencing the behaviour of investors such as tax breaks for longer term investment.

19 What are the most important factors which constrain quoted companies and fund managers from making longer term investment decisions, and how can we best address these factors?

Free text field:

No comment

20 Given public sector investment already accounts for a large share of equity deals in some regions, how can we best catalyse uptake of equity capital outside the South East?

Free text field:

Investors often cite proximity as an important factor in making an investment especially in early stage companies due to the perceived time lost in travel for the inevitable board meetings and oversight. Getting more equity deals outside the South East thus requires persuading more equity firms to be based away from the SE, but this is difficult as the City often provide the sources of their funds and equity firms have a heightened need to be near their suppliers (of capital).

A potential solution is more joint public private equity funds for example modelled on the successful German High-Tech Gründerfonds www.high-tech-gruenderfonds.de constructed to have a regional network structure. Funds based in the developed administrations should also help their regional spread of investment.

21 How can we drive the adoption of new funding opportunities like crowdfunding across the country?

Free text field:

Raising awareness and giving case studies, where this has been successfully applied.

22 What are the barriers faced by those businesses that have the potential to scale-up and achieve greater growth, and how can we address these barriers? Where are there outstanding examples of business networks for fast growing firms which we could learn from or spread?

Free text field:

From the view point of the photonics industry one of the greatest barriers industry face is access to capex to invest in next generation manufacturing machinery. This is particularly hampering investment in laser based processing by UK manufacturing which significantly lags investment in similar machinery in Germany and other high value manufacturing locations. Laser based processing machinery can be capital intensive and highly productive, but also requires parallel investment in process automation to get the most from the highest output equipment (whether marking, welding or cutting). Banking finance appears reluctant to invest in such technology although it has been proven for over 50 years, in part due to lack of knowledge of the benefits of laser processing in financial institutions. This is despite excellent examples of laser processing being used extensively in aerospace engine and automotive production.

Streamlining of banking means less individual evaluation is used in bank loan requests and decisions are often based on the historical performance of organisation. However, historic performance is not a good representation of future performance when a firm is investing in highly productivity enhancing capex – indeed it is the enabler to a step change in company performance that would break historic trends. Improved access to loan finance for next generation productivity solutions, such as laser based processing would greatly benefit UK manufacturing. This should be based on peer review of the productivity case and the absorptive capacity of the applicant and market, not historical financial performance. The proposed Innovate UK loans, reviewed through a similar process to current grant application would provide a valuable addition to supporting manufacturing scale-up in the UK.

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Improving procurement

23 Are there further steps that the government can take to support innovation through public procurement?

Free text field:

Next generation technology such as LED lighting, or photovoltaic power generation in and on public buildings / spaces is characterised by a high initial investment

with a long term >10 year pay back. Local authority budgets and procurement knowledge is not well structured to invest in such technologies which have a long services life and return-on-investment periods. Often, there is a split in departments that purchase and departments that look after maintenance, which complicates the situation. Measures to encourage longer term investment by local authorities in times of constrained budgets are urgently needed if we are to avoid spending public money on yesterday's solutions. This needs to include novel ways of structuring finance and access to expertise to enable local authorities to make informed purchasing decisions.

24 What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government's purchasing power to drive economic growth?

Free text field:

The NHS is the 5th biggest employer in the world and with health increasingly driven by technology should be leading the adoption of next generation technology. Instead innovative UK firms frequently export new health care solutions for years before making sales to the NHS. Technology, especially optical technologies which function non-invasively, have huge potential to reduce healthcare costs, both in treatment, and in pre / early clinical diagnostics. However, selling an equipment solution to the NHS requires engaging each NHS trust individually, an impossible task for a small innovative company. Ensuring that these trusts work better together regarding innovation, would be of significant benefit.

The need for early access to clinicians to validate new healthcare technologies is well documented. However, beyond this the NHS needs better access to expertise concerning which of many new equipment solutions proposed offer value for money and companies need a streamlined way to access the NHS. One potential solution would be body equivalent to NICE, but for medical equipment, giving confidence to NHS trusts to invest and suppliers clear value proposition targets.

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Encouraging trade and inward investment

25 What can the government do improve our support for firms wanting to start exporting? What can the government do to improve support for firms in increasing their exports?

Free text field:

The UK photonics industry is a net export industry. Over 90% of UK-produced photonics products are exported and thus the industry has considerable experience of what works in exporting high value technology.

The trade show access program (TAP) has been in operation for many years providing valuable route to international markets for new exporters. Exhibiting and participating in international trade shows is not cheap, but the hidden costs in logistics, organisation and preparation can be even higher and TAP substantially reduces barriers to exhibiting internationally. Despite the digitisation of commerce direct face-to-face meetings, most efficiently achieved at trade shows, remain vital to building relationships with international suppliers, customers and distributors. The TAP scheme should therefore be continued and expanded, whilst at the same time modernised and opened to new suppliers.

There is currently too much emphasis within TAP on returning to the same tradeshows because they are the 'safe' option. TAP should take more risks with support new shows in high growth markets such as China, and fully engage with the Knowledge Transfer Network and Innovate UK to identify and recruit companies to take to shows. Consideration should be given to who bears the risk, to encourage participation in high growth markets where it is less clear which is the dominant exhibitions. There should be greater support for pre and post show activities that drive potential customers to UK pavilions. This should include in-depth support of how to present products in markets where cultural or linguistic barriers are higher and fully leveraging the social media that is inevitably structured around such events.

More competition between TAP suppliers is required, by increasing the number of registered suppliers, or changing how TAP grants are administered to encourage innovation in how UK Pavilions and UK companies are presented in international trade shows. With Brexit it is vital the UK presents its best possible face internationally and this requires harnessing innovation in exhibiting and modernising the appearance of UK pavilions, which must compete for attention for our global competitors.

26 What can we learn from other countries to improve our support for inward investment and how we measure its success? Should we put more emphasis on measuring the impact of Foreign Direct Investment (FDI) on growth?

Free text field:

As noted previously high level of FDI reflects the UK's open flexible business environment. FDI therefore presents the most accessible route to finance for many high growth firms. Whilst this no doubt supports the growth of those companies it does reduce the number of UK owned mid to large size firms.

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Delivering affordable energy and clean growth

27 What are the most important steps the government should take to limit energy costs over the long-term?

Free text field:

No comment

28 How can we move towards a position in which energy is supplied by competitive markets without the requirement for on-going subsidy?

Free text field:

No comment

29 How can government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?

Free text field:

No Comment

30 How can government support businesses in realising cost savings through greater resource and energy efficiency?

Free text field:

Continuing to educate about the cost savings of more energy efficient products and emphasising that they provide the same quality as traditional products is required. For example, wider knowledge about energy efficient lighting is still lacking. Energy consumed by lighting is significant especially in office and retail spaces. This lack of understanding of the cost savings is combined with a perception that the quality of LED lighting is not as good as traditional lighting. However, such perceptions are inaccurate, indeed modern LED lighting can be adjusted to provide positive health benefits.

A barrier to adoption of new energy saving technology, e.g. LED lighting and Photovoltaics, comes from deploying poor low quality products and the resulting spread of perceptions that the technology in general is poor. Quality standards have a key role to play as do labelling and certification standards that allow UK manufactured products to be fairly compared and prevent low-cost low performance products to sour the market

To consider uptake of more energy efficiency such as lighting, is not necessarily in the hands of the company if a company rents its space and has fixed infrastructure in place. This is particularly true for small companies. The property owner that rents out the space is usually more focussed on low build cost and not efficient long running costs, something the market does not seem to drive. Educating about energy efficiency is therefore an important part.

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Cultivating world-leading sectors

31 How can the government and industry help sectors come together to identify the opportunities for a 'sector deal' to address - especially where industries are fragmented or not well defined?

Free text field:

Government should be pragmatic and flexible in its expectations of what a sector looks like. Some sectors will have a small number of large firms able to apply resources to develop and fund a sector deal such as the aerospace and automotive examples cited in the strategy. Other sectors, including photonics, are dominated by SMEs, with many subsectors and few large players, making engagement more complex, as those SME focus on the daily business of satisfying customers. However, it is important to engage with such sectors as they have a huge impact on UK productivity and competitiveness. For those sectors it will require direct support from the government, to enable the sector to come together and work on a sector deal.

Sector deals will require investment by companies, but what this looks like will vary significantly according to the makeup of the sector. Assessment of impact and growth potential for enabling technologies, such as photonics, is also more complex because they are frequently embedded in and/or form part of manufacturing process of much larger industries.

32 How can the government ensure that 'sector deals' promote competition and incorporate the interests of new entrants?

Free text field:

Government should be wary of only working with fixed vertical market segments that would preclude forming sectors deals, e.g. in photonics, that would have impact across many vertical segments.

Sector deals should be based on open membership models always accessible to new entrants. Thus, the organisations with which sectors deals are formulated should have minimal barriers to contributions from SMES and new entrants. Established industries with large trade bodies and corresponding large fees will be able to develop highly refined pitches for sector deals, but they are often less open. Furthermore, the greatest potential for growth and innovation may well come from newer less established sectors who may have a less refined sector pitch but offer greater efficiency and much greater impact.

33 How can the government and industry collaborate to enable growth in new sectors of the future that emerge around new technologies and new business models?

Free text field:

As noted above flexibility in what denotes a sector is key. It also vital to support horizontal enabling technology sectors as well as vertical established market segments. Indeed new vertical segments emerge from enabling technologies as innovators find new ways to combine enabling technologies. Thus support for

enabling tech provide the seed for new sectors of the future.

Support agencies like InnovateUK and its networks like the KTN can assist in linking to industry, either observing new trends or raising awareness of new technologies and business models.

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Driving growth across the whole country

34 Do you agree the principles set out in this section are the right ones? If not what is missing?

Free text field:

Many of the UK's most innovative companies, both in photonics and other areas are focused on global not regional markets. The old model that says start selling locally, then nationally then export is no longer relevant in the modern world. Plenty of industries – photonics is a great example- are born global. UK Photonics companies will often sell their first product to the USA, the second to China and as they grow continue to export 80-95% of output. Such companies are naturally less focused on local regions especially for sales. Although as noted above such born global firms are dependent on local labour.

Whilst the approach for ensuring the conditions are right for growth across the UK are broadly correct, particularly in skills and infrastructure, care is needed to consider how this approach supports born global companies.

35 What are the most important new approaches to raising skill levels in areas where they are lower? Where could investments in connectivity or innovation do most to help drive growth across the country?

Free text field:

There are many industries, including photonics, that are already well distributed around the UK, with vibrant clusters of production from Glasgow, to Manchester, South Wales and Southampton. Frequently businesses in these areas are already well connected to higher education institutes in their area and beyond, many of which are globally leading. Further investment in these institutes especially in training at the highest skills level, e.g via Centres of Doctoral training is very much encourage. Although doctoral graduates are potentially highly internationally mobile, many still choose to settle and take up industrial employment close to the location of their doctoral training. Thus support of geographically dispersed DTC's supports distribution of high level skills.

Connectivity to further education colleges, especially from the most innovative global facing firms, is less common and requires greater emphasis to raise the level of locally relevant technical training, notwithstanding prior observations that not all FEC colleges can provide all courses.

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Creating the right institutions to bring together sectors and places

36 Recognising the need for local initiative and leadership, how should we best work with local areas to create and strengthen key local institutions?

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As noted care is needed that a focus on local initiatives does not neglect globally focused organisations and sectors that already have strong geographic distribution throughout the UK. Such sectors, including photonics, are important to the UK as a whole especially exports, but may not feature as dominant in a single region or have a historical focus on local initiatives.

37 What are the most important institutions which we need to upgrade or support to back growth in particular areas?

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Within England LEPs need support to understand their local industrial and innovation strengths in areas outside the expertise of the individual local LEP boards.

38 Are there institutions missing in certain areas which we could help create or strengthen to support local growth?

Free text field:

The loss of the Manufacturing Advisory Service has reduced mechanisms for spreading best practice and high productivity solutions within the established manufacturing industry. An alternative authoritative, possibly regional focused network, whose input was valued by industry would help spread, e.g. the benefit of laser based processing in manufacturing, and in future technologies such as 3D printing and other digital technologies to ensure their early and widespread adoption in UK manufacturing.

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