

Response to the BIS Select Committee inquiry on Industrial Strategy

Written evidence submitted by The Research & Development Society

Introduction

Founded more than 50 years ago, the underlying aim of the R&D Society has been to be the authoritative and representative voice of R&D in the UK. In this context, as the R&D landscape has changed, we have recognised the need to embrace such influences as globalisation and the need for multi-faceted collaboration, the reduction in budgets and changes in funding mechanisms, and the need to link development effort with end-user driven innovation. Our focus is on making the UK one of the most attractive global environments for R&D, with a particular emphasis on realising its potential to make a positive impact on social and economic wealth in the UK. The R&D Society welcomes the opportunity to submit comments to the House of Commons BIS Committee on its Industrial Strategy consultation.

Summary

- An Industrial Strategy defines the relationship between Government and Industry (Business), in order to accelerate growth in the UK economy. It needs to focus on policies which remove barriers to growth and enable companies to grow faster. It is important to understand the whole commercialisation process to the end user, as terms such as 'research', 'R&D' and 'innovation' have become conflated and can lead to an incorrect policy focus. Much innovation and commercial success does not come directly from research, and within companies the precise boundary between where R&D finishes and commercialisation begins is not well-defined. This can have major implications for development of an industrial strategy. In particular, published data on R&D expenditure can be hard to interpret if some countries/industries define R&D expenditure more broadly than others. This can in turn affect rules on investment and tax treatment based on the role of the state versus the private sector, potentially impacting support for innovation.
- A national industrial strategy provides a link between macro-economic policies and the business strategies at the level of the firm and needs to address issues such as customer needs/market structures, product and service development, manufacturing and distribution, availability of financial and human resources, use of global science and technology, competition and regulation. An industrial strategy requires a cross-government approach that ensures that policies across government are aligned with the strategy and support is at the highest level. Policies will need to be agreed on issues that cut across areas such as skills, access to finance and procurement. One of the biggest opportunities is in

public procurement but the current SBRI approach is too limited and does not address the biggest spends on public procurement. Construction, healthcare, and education represent major opportunities for public procurement as part of the Industrial Strategy post Brexit.

- Manufacturing know-how crosses sectors and industries, and will be important in the development of emerging industries such as personalised medicine and products to interface with the Internet of Things. Existing manufacturing process knowledge (e.g.: statistical process control) can be widely applied in these new industries if recognition is given to this underpinning capability. Both Germany and the USA have emphasised the importance of manufacturing.

Submission

1. The R&D Society welcomes the opportunity to submit comments to the House of Commons BIS Committee on its Industrial Strategy consultation. We believe the government's sustained commitment to an industrial strategy for the UK will be vital for accelerating UK economic growth. The result of the EU referendum places an even greater emphasis on an industrial strategy which provides a clear long-term goal and roadmap for how the UK can continue to grow as a globally competitive country and a technology leader.

Q1. What does the Government mean by industrial strategy, and what does the private sector want from one?

2. The coalition Government Industrial Strategy report 2014¹ defined Industrial Strategy thus: "Industrial strategy is about the whole of government working in partnership with industry to set out and deliver long-term plans to secure jobs and growth". It is essentially a Government to Business economic growth pact. The R&D Society considers that this broad aim remains a good working definition. However, the detailed action plan needs to be modified to reflect the issues and opportunities represented by Brexit.
3. And in that context we do need to separate out research from innovation. Research is about creating knowledge and innovation is about creating wealth. Therefore an industrial strategy is a government response to support businesses leading to innovation and economic growth. We are concerned that there still appears to be an emphasis in Government policy on a linear model where research is the dominant source of commercial application. There is

¹ Industrial strategy: government and industry in partnership - progress report, Ref: BIS/14/707, PDF, 1.52MB, 58 pages <https://www.gov.uk/government/publications/industrial-strategy-early-successes-and-future-priorities>

considerable evidence that much innovation and commercial success does not come directly from research – for example, container freight transformation of shipping or, looking forward, the blockchain algorithm currently used in bitcoins but which has the potential to handle all forms of secure transactions.

4. However, where science and technology-enabled innovation is concerned there are a number of difficulties related to understanding the R&D process in industry. Traditionally, in industry, early stages of creating new products and services have been referred to as R&D with the later stages concentrating on commercialisation. However, in today's business environment, the precise boundary between where R&D finishes and commercialisation begins is not well-defined. This can have major implications for development of an industrial strategy. In particular, published data on R&D expenditure can be hard to interpret if some countries/industries define R&D expenditure more broadly than others. This can in turn affect rules on investment and tax treatment based on the role of the state versus the private sector, potentially impacting support for innovation. We need a more rigorous approach to understand and describe the commercialisation process if we are to more precisely discuss issues around the framing of industrial strategies, including the roles of the private and public sectors, and arguments for market intervention. The R&D Society is supporting emerging ideas to address this issue, which will be published later this year.
5. A national industrial strategy provides a link between macro-economic policies and the business strategies at the level of the firm and needs to address issues such as customer needs/market structures, product and service development [the 'D' of R&D], manufacturing and distribution, availability of financial and human resources, use of global science and technology, competition and regulation. The strategy will show that government is committed to providing a stable policy framework for key sectors and technologies enabling business to have confidence in developing long-term plans and strategies. An Industrial Strategy also gives a strong signal (both domestically and internationally) that government recognises that a strong competitive industrial base is an important part of the UK's growth strategy.
6. An industrial strategy requires a cross-government approach which ensures that policies across government are aligned with the strategy and support is at the highest level. We are encouraged by the creation of the Economy and Industrial Strategy Committee chaired by the Prime Minister and involving Secretaries of State from major relevant departments, as this gives a strong signal about importance Government attaches to UK business. Policies will need to be agreed on issues which cut across areas such as skills, access to finance, and procurement. Business will be looking for support for current and emerging

sectors, with priority for sectors where there is potential for the UK to be a market leader and to create growth.

Q2. How interventionist in the free market should Government be in implementing an industrial strategy, for example in preventing foreign takeovers of UK companies?

7. Global investment is competitive and the UK has to compete with other countries to encourage investors to develop and manufacture products and base the provision of services in the UK. In general, we believe the responsibility for ownership of a company should lie with the shareholders.
8. However, when companies become sufficiently large to become strategically significant (for example, in terms of impact on people employed, or supply chains) or fledgling companies in key sectors are takeover targets, a greater degree of Government oversight is required. Any Government intervention needs to address two key questions:
 - What does the investing company bring to the party in terms of technology, manufacturing skills, or access to markets? and
 - What is its long-term commitment to developing the UK company and how will this be ensured?
9. The recent sale Arm Holdings to Japan's SoftBank has raised some strong concerns from senior industrialists, not least of which is the ability of the government to ensure that the assurances given by the purchaser – such as maintaining employment and the location of headquarters in the UK - are met². Those who argued for no government involvement in the Arm Holdings takeover believe that even if the foreign investment results in losses for the home economy there will be plenty of other start-ups who might replace ARM and grow on the back of the new market for the Internet of Things (IoT). While it is undoubtedly true that the UK does have a leading technology capability in this area, there is growing evidence that the conditions that enabled ARM to grow in the 1990s no longer prevail. A leader article in the Economist magazine³, warned that large incumbents in the tech sector are increasingly using acquisitions of startups ('shoot-out acquisitions') with a view to eliminating potential rivals – good for startup entrepreneurs but very bad for

² House of Commons Library, September 2016, Briefing Paper Number 05374, Mergers & takeovers : the public interest test

<http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN05374>

³ Nostrums for rostrums, The Economist, 28 May 2016

<http://www.economist.com/news/leaders/21699447-growing-power-online-platforms-worrisome-regulators-should-tread>

the UK economy. A completely free market approach in this area risks fledgling companies in key growth areas being taken over by large foreign corporations and the UK approach needs to be fully debated as part of the Brexit/Industrial Strategy development. There are examples globally of where Government support for emerging industries has been important for enabling leading positions to be reached, eg: LCD production in South Korea.

10. International companies have historically located and invested in the UK because of access to the European Single Market and access to a skilled and experienced European workforce. This will be affected by the UK's exit from the European Union. Government must look for ways to 'anchor' key companies to the UK in order to offset this effect. For example in healthcare, close proximity of research and teaching hospitals and a more enlightened clinical trial regime could be attractive to pharma companies.

Q3. What lessons can be learnt from: Previous governments industrial strategies? Other countries' attempts to develop industrial strategies?

11. The Coalition government's Industrial Strategy had some important ingredients for a successful implementation in particular the support of major industrial sectors, the Trade Unions and trade associations. Ministerial support for this approach appeared to have been put on the back burner following the last General Election but has now been resurrected by the new Prime Minister. We welcome this new drive but emphasise that the approach will be discredited unless there is high level and continuous support for an Industrial Strategy. Having said that, there are some weaknesses in the previous Strategy which need to be addressed.
12. **Public procurement** This topic has been mentioned consistently in government plans over the last twelve years since the first Government Innovation report in 2003, but successive policies have failed to seize the potential opportunity of encouraging innovation through procurement. Government policy at the present time relies on the so-called Small Business Research Initiative (SBRI) scheme. SBRI is far too limited in scope, only applying to Departmental research spend, and is miniscule in relation to the overall Public Procurement spend. Publishing information about government contracts alone will not be sufficient to encourage businesses to invest capacity-building. They need to have more confidence in the security of the pipeline of opportunities. The biggest spends on public procurement relate to construction, healthcare and education and these represent major opportunities for public procurement as part of the Industrial Strategy post Brexit.
13. **Manufacturing** Manufacturing know-how crosses sectors and industries.

Advanced production capability will be critical to the development of emerging industries such as personalised medicine and products to interface with the Internet of Things. Existing manufacturing process knowledge (e.g.: statistical process control) can be widely applied in these new industries if recognition is given to this underpinning capability. In that regard we believe the closing of the Manufacturing Advisory Service was a mistake and we need to make more use of the many intermediate technology support groups who come under the Research Technology Organisation banner.

14. Germany has been very effective in galvanising German Industry under the 'Industrie 4.0' banner to promote the impact of the digital revolution on their industry. This was an initiative led by industry and UK industry needs to develop a similar cross sector response supported by Government. New thinking in the area of how companies grows suggests that there are barriers to growth other than finance, particularly in growing the customer base for new products and services. Factors such as user needs definition, commercialisation, and business models may be equally as important as financing and will need to be evaluated for Government/Business action.
15. The USA has recently re-focused its industrial strategy, characterised by President Obama's presidential address earlier this year under the heading of, 'Innovation to forge a better future'. This placed emphasis, among other initiatives, on infrastructure, prioritising industrial R&D, revitalising American Manufacturing through investment in the National Network of Manufacturing Innovation, creating industries for the future and expanding the Research and Experimentation tax credit for the private sector.

Q4. What tensions exist between the objectives of an industrial strategy and the objectives of other policies, and how should the Government address these tensions?

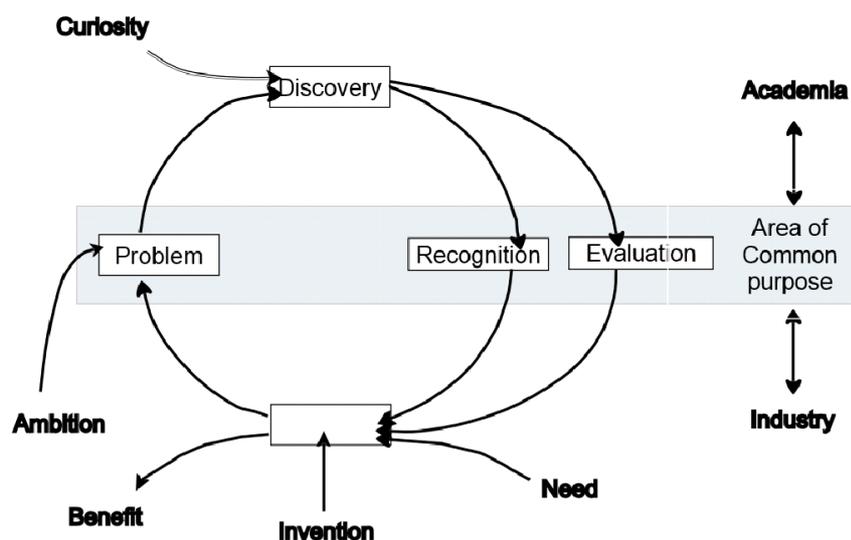
16. An industrial strategy needs to be underpinned by world class research in science and engineering, including both long-term, curiosity-led research and research with a more immediate focus on addressing industry challenges. In the latter case, there is an opportunity for the Research Councils to put greater emphasis on developments which have an impact on Government policy delivery such as healthcare, environment and energy. The creation of an overarching body for the Research Councils (UKRI) presents the opportunity to refocus UK research efforts along the lines above. There are however serious concerns (ref Royal Academy of Engineering⁴ and House of Lords letter to

⁴ Innovate UK's integration with Research UK, Feb 2016: A submission to the Department

Minister for Universities⁵) that the integration of Innovate-UK will move support away from Industry.

17. The R&D Society strongly believes that we need to move away from the linear model of research 'push' which has characterised Government policy and recognise the distinct roles of industry and academe and where they have common purpose. In that regard we think the schematic drawn up by Sir John Fairclough, a previous Chief Scientific Advisory, is highly relevant. Note in particular, a large part of industrial activity takes place without any engagement from academe.

Chief Scientific Advisory, 1995



18. So the Industrial Strategy needs to recognise that the nature of innovation has changed. For example, Services, which offer the UK economy the greatest growth potential, are more likely to use technology than develop it. Much innovation is about combining existing ideas in novel ways and may come from exploitation of new business models, organisation and people development, design and branding. The OECD recognised this as long ago as 2010 where they wrote "effective innovation policies must reflect how innovation takes place today. Invention becomes innovation through a range of complementary

for Business, Innovation and Skills' consultation on the proposed integration of Innovate UK into Research UK, accessible from <http://www.raeng.org.uk/publications/responses>

⁵ Letter to Jo Johnson MP, Minister of State for Universities and Science, Department for Business, Innovation and Skills (BIS), accessible from <http://www.parliament.uk/business/committees/committees-a-z/lords-select/science-and-technology-committee/news-parliament-2015/innovate-uk-bis-correspondence/>

activities in a highly interactive and multidisciplinary process which involves collaboration by a growing and diverse network of stakeholders, institutions and users: Policy will need to move beyond supply-side policies focused on R&D and specific technologies to a more systemic approach that takes account of the many factors and actors that affect innovation performance". The Industrial Strategy will need to demonstrate how this is to be achieved.

19. Therefore we argue that a systems approach to policymaking is required. This requires a top down overview of policies to identify where interdependencies exist and if policies can be aligned so that they mutually reinforce each other. Similarly at a local level there are policies which would benefit from joining up for more effect, for example, healthcare, social care and housing. There are clearly important policy interfaces on, for example, Brexit, trade, infrastructure, digital strategy, immigration, procurement, human resources and tax.

Q5. What are the pros and cons of an industrial strategy adopting a sectoral approach?

- Should the Government proactively seek to 'pick winners'?
 - What criteria should be used to identify which sectors are supported?
 - Should the Government prop up traditional industries that it considers to be in the national interest?
 - If not a sectoral approach, should the industrial strategy have a broader objective, such as improving productivity?
20. Existing sectors have established structures and the sector councils can provide direction on where broad government support is required. Rather than assume they have a role for life, their effectiveness should be judged over time on the performance of the sector. But there are emerging sectors that will create new jobs and growth in the future (for example, the so-called 'Internet of things' will cross many traditional sectors, and personalised medicine will require new manufacturing and delivery processes). Collaboration between existing sector councils may be a way to explore where the emerging opportunities will arise and Government has a role to play in facilitating this.
21. In examining the criteria that government and business should use in identifying which sectors to support, there are several important considerations:
- Where does the UK stand competitively in that sector?
 - What is the pace of change in the sector?
 - How is the sector evolving?
 - Market size and growth potential
- The ability to compete (e.g.: technology, skills, investment) will determine whether this is an attractive sector for development.

22. The Industrial Strategy should act upon some of the outstanding analytical work already commissioned by Government. Among these we believe that the Foresight report on the Future of Manufacturing⁶ and supporting evidence has some immediate recommendations which should be considered as part of the Industrial Strategy.

Q6. Should the industrial strategy have a geographical emphasis? How should an industrial strategy link with devolution initiatives aimed at devolving taxation and decision making away from Westminster? What examples are there of interventions from central Government that have successfully supported economic growth away from London and the South East of England? How should the industrial strategy work with local authorities and Local Economic Partnerships, reconciling a U.K.-wide strategy and local, regional and devolved nations' priorities?

23. The Regional Development Agencies (RDAs) were abolished in 2010 and Local Enterprise Partnerships (LEPs) were given a remit to support innovation within the local areas. Performance of the LEPs to date has not been demonstrated. This may be due to a lack of clear direction and the very low level of funding compared to the RDAs⁷. With sufficient resource (skilled, experienced people, and finance) the LEPs do have the potential to deliver much more regionally and Government should look to build on what is already in place and draw on the lessons learnt from the successes/failures of the RDAs and work to get more active engagement of industry, Chambers of Commerce, and trade unions. Regional opportunities need to be identified as part of developing the Industrial Strategy and action plans suitably funded.

Authored on behalf of the Research & Development Society (www.rdsoc.org) by Board members Dr David Hughes and Dr Uday Phadke, 27 September 2016

Biographies

Dr David Hughes

⁶ The future of manufacturing: a new era of opportunity and challenge for the UK - project report, Ref: BIS/13/809, PDF, 5.48MB, 250 pages

<https://www.gov.uk/government/publications/future-of-manufacturing>

⁷ The Dowling review of business-university research collaborations, July 2015,

<http://www.raeng.org.uk/policy/dowling-review>

Dr David Hughes is currently a consultant advising on innovation strategy. He has held senior management positions with multinational companies including Ford, Lucas, GEC/Marconi and BAE Systems. From 2002-2006, he was the Director General, Innovation Group at the DTI and was responsible for developing the first Innovation Report (2003) and proposal to set up the Technology Strategy Board (now Innovate UK) which was launched successfully in 2004.

He has a long standing interest in helping companies to maximise profitable growth through innovation strategies, hence his current interest in the industrial strategy debate. He is a Fellow of the Royal Academy of Engineering, and a Chartered Director (IoD).

Dr Uday Phadke

Dr Uday Phadke has worked in a wide range of academic, technical, commercial and strategic roles in Europe, North America and Asia over the last three decades. He has been actively involved in the building of over 100 technology firms over the last two decades, as an advisor, mentor and investor, working closely with technology transfer offices, innovation agencies, incubators and accelerators.

He has also been part of the founding team at a number of technology advisory and consulting companies since the early 1980s. Since 1997 he has been Chief Executive of [Cartezia](#), the technology business builder based in Cambridge, UK. He was Entrepreneur-in-Residence at the Judge Business School at the University of Cambridge from 2011 to 2016 and is now actively involved in several innovation policy development initiatives in Europe and Asia. His new book on science and technology commercialisation, *Camels, Tigers and Unicorns*, will be published later this year.

He has a wide and deep technical background in a number of technology areas, including aerospace engineering, digital signal processing, remote sensing, electronics, computing & software, medical diagnostics, engineering design, media and telecommunications, financial technologies and digital media.