

# Life Sciences and the Industrial Strategy inquiry

CaSE submission | 15th September 2017

## Summary

1. In this submission, we respond to some of the questions set out by the House of Lords Science & Technology Committee, and also reflect on the published Life Sciences Industrial Strategy. In particular, we focus on three broad areas, Science & innovation, Life Sciences Industrial Strategy and Brexit:
  - The Government has a central role to play in the funding of research and development to maximise economic benefits of science
  - The Life Sciences Industrial Strategy, and each sector strategy, must integrate with the overarching Industrial Strategy
  - The availability of a skilled workforce is key to the success of the life sciences, and all of research and innovation in the UK
  - UK-EU collaborations are of immense value to scientific research and concerted efforts should be made to maintain collaborative research.

## About CaSE

2. The Campaign for Science and Engineering (CaSE) is the leading independent advocate for science and engineering in the UK. CaSE believes the UK government should support a healthy and flourishing science base in which all parts of this integrated system are well funded and performing optimally. CaSE works to ensure that the UK has the policies, funding and skills to enable science and engineering thrive. We are funded by individuals and around 100 organisations including businesses, universities, learned and professional organisations, and research charities. Collectively our members employ 360,000 people in the UK, and our industry and charity members invest around £34.9bn a year in R&D globally<sup>1</sup>.
3. We welcome the opportunity to feed into this inquiry from the perspective of an organisation representing the breadth of science and engineering. Many of the principles and priorities we set out for a successful Life Sciences Industrial Strategy could equally apply to other sector strategies and are also relevant to the success of the overarching Industrial Strategy. Our member organisations, many of which operate within the life sciences sector, have helped to shape our response.

## Science & innovation

Investment in science yields productivity and growth

4. R&D and human capital are universal drivers of productivity<sup>2</sup>. Analysis shows that some of the most R&D intensive sectors have considerably higher GVA per worker compared with the average

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<sup>1</sup> Figure calculated in October 2016 from latest available data

<sup>2</sup> "On the Robustness of R&D", Kul, Khan and Theodoridis, Journal of Productivity Analysis, vol. 42 (2014), 137-155

- across the UK. For example, as part of the life science sector, the R&D-intensive pharmaceutical industry has one of the highest Gross Value Added (GVA's) per employee, with £155k in 2014<sup>3</sup>.m
5. In addition to increasing productivity, economic growth – as well as sharing the proceeds of wealth – is a key aim of the Government, therefore increasing investment in R&D is an appropriate priority in the years ahead. The Government has a role to play in taking early-stage risks. This holds true in life sciences where there is typically a long lag time from initial research investment to monetised benefit (for example, the average time lag between investment in cancer research and eventual impact on patients is around 15 years<sup>4</sup>) and where the benefit returns broadly across society more than to the investor alone. Public investment is a virtuous circle, as research shows that Government investment in R&D 'crowds-in' further private sector investment as well as other productivity boosting effects such as contributing to raising the level of the skills base in the UK, boosting human capital. Research commissioned by CaSE has shown that every £1 of public investment in R&D raises private sector output by 20p each year in perpetuity<sup>5</sup>. Therefore, investment cannot merely be expected from business; our evidence shows that public investment is key in initiating private investment in research. CaSE supports the recommendation in the Life Sciences Industrial Strategy that the UK must aim to increase both public and private investment in R&D.
  6. The Industrial Strategy, alongside the new strategy, processes and mechanisms to be put in place by UKRI, will be crucial in ensuring any funding is spent well. One long-standing feature of the UK research system that supports efficient and effective use of funding for research is the dual support system. In April of this year, Parliament put the dual support system, or the balanced funding principle, into law for the first time. The Government must not fall at the first hurdle by failing to invest in one of the two sides, namely Quality-Related research funding. This block funding, carefully and efficiently distributed based on rigorous assessment of past research excellence is an essential part of the funding mix. It supports creativity and early-stage exploratory research and acts as platform funding from which partnerships and research careers can develop. As part of the additional £2bn a year funding and any further increases to reach the Government's 2.4% of GDP target, the baseline level of Quality-Related research funding must be raised alongside increases in Innovate UK and Research Council budgets to uphold the 'balanced funding principle' and ensure funding is used well. There is good evidence of the return on investment each of these provide<sup>6</sup>. Such a commitment would be in line with the Chancellor's recognition that the much bigger prize than incremental productivity improvements requires early stage investment in research in universities and research institutes as well as company R&D facilities.
  7. Over the long-term, government taking on and providing mechanisms to share early stage risks enables the creation of private sector jobs in entirely new markets, as well as delivering societal benefits. To develop new life science technologies and deliver the health gains and economic benefits of the future, longer term funding programmes are required. The Industrial Strategy and Life Science sector strategy must work together to provide sufficient funding, stability, and

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<sup>3</sup> CaSE analysis of ONS Annual Business Survey, 2016

<sup>4</sup> <https://www.mrc.ac.uk/publications/browse/medical-research-whats-it-worth/>

<sup>5</sup> 'The Economic Significance of the UK Science Base: a report for the Campaign for Science and Engineering', Haskel, Hughes and Bascavusoglu-Moreau, April 2014

<sup>6</sup> 'The Economic Significance of the UK Science Base: a report for the Campaign for Science and Engineering', Haskel, Hughes and Bascavusoglu-Moreau, April 2014

confidence for research organisations and investors alike beyond the lifetime of a single parliament.

Maintaining the UK's strong science base

8. Across sectors, including the life sciences, access to expertise and world class facilities are repeatedly cited as key attractors along with the international reputation of the UK's research and innovation institutions. Our industry members tell us that the strength of the UK's research base is a defining attractor. The most direct evidence of this effect in the UK is that multinational pharmaceutical firms locate their laboratories near to universities with excellent chemistry research<sup>7</sup>. The Life Sciences Industrial Strategy has a target to attract ten large and ten small capital investments over the next five years, and puts the onus on the UK Government to optimise the fiscal environment for investment. It is impossible to divorce the investment environment in the UK from the wider context of Brexit. It would therefore be valuable for the Committee's inquiry to test the extent to which government's planned fiscal measures and incentives to attract such investment for life sciences are sufficient in the context of leaving the EU and competition from our international peers.

## Life Sciences Industrial Strategy

Life Sciences Industrial Strategy must integrate into overarching Industrial Strategy

9. One of the comments we received from members was that this Life Sciences strategy must be imbedded into the Industrial Strategy; forming part of a long-term Industrial Strategy, preferably with cross-party, and cross-UK buy-in to support commitments that stretch beyond the current political cycle. This would bring welcome stability and confidence in the midst of enormous uncertainty created by Brexit, and contribute to the Industrial Strategy aims of making the UK attractive for industry as a place to locate, invest and grow.
10. Stability and predictability should not be confused with being risk averse and not open to change. The Government should be prepared to take some evidence-informed risks with this strategy. Trying new things, perhaps at small scale, and stopping or scaling up based on robust evaluation should be a feature of the approach taken in this strategy. Arguably political risk is greatest when policymakers advocate a programme and then cannot amend it no matter what the results<sup>8</sup>. In this sense, evaluation, and planning for evaluation as part of policy announcements in this Industrial Strategy, can reduce political risk and help ensure the strategy has flexibility built into it to respond to new opportunities and emerging evidence. This inquiry provides a good opportunity to seek clarity from government on how the Life Sciences Industrial Strategy, and other sector strategies, will interact with the overarching Industrial Strategy.

Clarify the scope of the Life Sciences Industrial Strategy

11. Comments from our members have raised concern over the breadth of the Life Sciences Industrial Strategy. The life science sector includes hugely important fields including synthetic biology, agriculture and food, but these areas of life science are largely discounted in the Life Sciences Industrial Strategy. The Committee's inquiry provides an opportunity to gain clarity on the scope of

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<sup>7</sup> The Economic Significance of the UK Science Base, Haskel et al for CaSE, 2014

<sup>8</sup> A framework for mandatory impact evaluation to ensure well informed public policy decisions, Oxman et al, 2010

the Life Science strategy, as the language currently used to describe the ‘life science sector’ makes little note of large areas of the sector.

12. Sir John Bell was initially charged with creating a strategy to make the UK the best place in the world to invest in life sciences. Although the Life Sciences Industrial Strategy does contain a section on investment, the committee should also seek to scrutinize how the report meets those aims and whether there are additional recommendations the committee could make on improving the environment for investment in life sciences.

What can be learned from the previous Life Science strategy

13. We are half way through the present ten-year 2011 *Strategy for UK Life Sciences*<sup>9</sup>, created by the Coalition Government. *Innovation, Health and Wealth* was also published in that year with the intention, in part, to support the life sciences sector. These life science strategies have had some successes – for example the Biomedical Catalyst<sup>10</sup> was a key part of the *Strategy for UK Life Sciences*. A report co-authored by the four leading UK human healthcare trade associations that are partners in LifeSciencesUK, showed that the early progress made in the 2011 strategy was hindered by a lack of accountability and loss of leadership<sup>11</sup>. The leadership of the Life Sciences Industrial Strategy must be clarified as early as possible, to ensure that responsibility can be shouldered and that recommendations can be delivered over the full lifetime of the strategy.
14. With sponsorship of the life science sector split between the Department for Business, Energy and Industrial Strategy and the Department of Health, there has not always been consistent leadership for life science sector policy. Indeed, as already commented, the wider life science sector includes industries that sit within the remit of the Department for Environment and Rural Affairs. The Government should endeavour to improve cross-departmental join up and accountability with regards to the sector strategy and the overarching Industrial Strategy.
15. The summary of recommendations in the Life Sciences Industrial Strategy setting out long-term goals is a clear statement of ambition. To aid accountability, the Life Sciences Industrial Strategy should contain a series of interim milestones on their delivery priorities. In addition to these strategic goals, the report should set out who is accountable for the delivery of the respective goals, whether it be government departments, private sector business, universities or a combination of these organisations.

Small Business Research Initiative

16. The Small Business Research Initiative (SBRI) is one example of an initiative that provides a way to harness the government machine as a whole to support the growth of innovative companies to improve the success of small R&D-based businesses in obtaining contracts from government bodies, which can be the difference between success and failure. It is also one way for Government to play an active role in industry policy by harnessing the competitive process, rather than trying to pick individual winners. However, it has patchy uptake across government departments and indeed the NHS. There is a lot of support for the Government’s aim of ensuring a third of its procurement spend is with small businesses by 2020. Evaluation of whether this target is met must be built in to the overall Industrial Strategy, but the Life Sciences Industrial Strategy

<sup>9</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/32457/11-1429-strategy-for-uk-life-sciences.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32457/11-1429-strategy-for-uk-life-sciences.pdf)

<sup>10</sup> <https://www.mrc.ac.uk/funding/science-areas/translation/biomedical-catalyst/>

<sup>11</sup> From vision to action: delivery of the Strategy for UK Life Sciences, LifeSciencesUK, 2014

must monitor the progress of SBRI for life science business, which can then be used to inform future policy decisions.

17. To achieve this target the government will likely have to review its procurement frameworks and guidelines. While there is the ambition for procurement to support smaller companies and innovation, in reality, practical barriers in contracts intended to reduce the government's exposure to risk prevent participation. For instance, there can be a requirement to have a minimum turnover (such as £10m) and to present five years' accounts. It is within the power of the UK Government to address this immediately. More broadly, while still a member of the EU the UK is required to adhere to EU directives on public procurement, however in the medium term leaving the EU provides the opportunity to review procurement guidelines. The Cabinet Office should develop UK procurement guidelines to ensure they support innovation and participation of SMEs and start-ups.

A skilled workforce is key for life sciences

18. The Life Sciences Industrial Strategy rightly identifies developing a skilled workforce as essential for future competitiveness of the sector. The Skills Action Plan it proposes could be beneficial but risks duplicating efforts more broadly across STEM sectors. Many of the essential skills and skill shortages, such as in data science, engineering and manufacturing impact broadly across industries. This will be an area where coordination across relevant departments and sector groups will be crucial. The overarching Industrial Strategy will undoubtedly have a strong skills element and any work done as part of the Life Sciences Industrial Strategy must feed into and be informed by this wider work.
19. The Life Sciences Industrial Strategy rightly sets out the need for the life science sector to be able to use the apprenticeship levy to meet their workforce needs. CaSE strongly supports this recommendation. To achieve this, funding and scheme rules must provide sufficient flexibility for employers. Robust evaluation against milestones set out in the Industrial Strategy, and perhaps also at a sector strategy level, should be undertaken each year to ensure the policy is supporting industry needs and strategy aims. For instance, we have previously proposed the Industrial Strategy includes a target for the number of apprenticeships that will be at level 4 and above, perhaps with a focus on science, technology and engineering.
20. From lecture halls, to the lab bench and our hospitals, the life science sector is highly international, and benefits from skills and expertise from around the world. This must continue if the UK life science sector is to thrive. Some member organisations have raised concern about the availability of early careers scientists, those coming to the UK in postgraduate or postdoctoral roles. The Government has pledged to continue to attract the brightest and the best to the UK, and although many exceptional early career scientists train in the UK, the Government must ensure that businesses, universities and research organisations can continue to attract foreign talent at every career stage. The UK needs an immigration system that is fair, fast, transparent and flexible to meet the UK's skills needs and research priorities. CaSE recommends that UK scientists and engineers should be able to undertake research in the EU without a visa following Brexit, and vice-versa.

Brexit

21. The life science sector, along with the entirety of science and engineering, is experiencing a period of uncertainty with regards to the future of regulations, funding, and the movement of people

post-Brexit. The ability to openly collaborate with EU countries in R&D has been mutually beneficial for the UK and the EU across science. Some of the issues outlined would not strictly fall under the jurisdiction of the Life Sciences Industrial Strategy, but are some issues that the life science sector could face during and after Brexit negotiations.

#### Regulatory priorities for life science

22. Regulatory divergence between the UK and the EU could be an opportunity but is also a significant risk of Brexit for life sciences. This is an area where there will be significant technical and sector/industry specific expertise required to ensure regulation is fit for purpose. Appropriate structures and processes should be put in place by the UK Government and Parliament to ensure scientific and technical expertise within life science and the NHS, and advice is appropriately accessed throughout the process of leaving the EU. This includes ensuring that appropriate structures, processes and appointments are built into the Departments for Exiting the EU and International Trade where regulation and standards will be a significant feature of their work.
23. EU regulation is and has been heavily influenced by the UK. In its position as a scientific leader within the EU, and as a nation with comparatively developed and embedded mechanisms and structures for accessing and using scientific advice, the UK's influence on EU regulations has arguably contributed to ensuring countries across the EU, including the UK, benefit from an improved regulatory environment. Concerns remain that on leaving the EU the UK will lose influence at all levels, including within regulatory bodies such as the European Medicines Agency (EMA). As the UK is likely to still have to abide by EU regulation in a broad range of areas due to conditions of trade, collaboration or funding, losing influence could negatively impact on the UK life science sector. A strand of the Life Sciences strategy should consider how such influence will be maintained to be able to continue to provide evidence-based input to shape the direction of EU regulatory development.

#### International collaboration in the life sciences

24. Following engagement with our member organisations across the sector, maintaining access to joint research programmes and the opportunities for EU scientists to travel freely for research as we leave the EU were viewed as imperative for the future of science in the UK. Therefore, we are pleased that the Government, in its Brexit science paper, made their ambition for close association with the EU on collaborative EU R&D programmes post-Brexit<sup>12</sup>.
25. Research and innovation is an aspect of our relationship with the EU that is widely recognised as mutually beneficial. In the case of medical research, a joint report by eight leading medical organisations and charities underlined the impact of not only UK-based research on global healthcare, but also the beneficial nature of UK-EU collaborations in the field. The UK is an important partner in the EU research landscape, contributing to almost 20% of the total research work carried out within EU health programmes between 2007 and 2016. Medical papers co-authored by UK and EU researchers receive more citations than the average UK-only or EU-only paper. Similarly, the proportion of top 10% highly-cited publications increases from 15% to 23% for the EU26 when collaborating with the UK<sup>13</sup>. Clearly collaborative work with the EU has been of

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<sup>12</sup>[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/642542/Science\\_and\\_innovation\\_paper.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/642542/Science_and_innovation_paper.pdf)

<sup>13</sup>[http://www.cancerresearchuk.org/sites/default/files/uk\\_and\\_eu\\_research\\_full\\_report\\_v6.pdf](http://www.cancerresearchuk.org/sites/default/files/uk_and_eu_research_full_report_v6.pdf)

great benefit to the UK, and must be maintained following Brexit to continue to support the life science research base in the UK.

26. The Life Sciences Industrial Strategy, in addition to the overarching Industrial Strategy, has made reference to improving economic growth in all regions of the UK. For the life sciences, there are a range of proposals including regional incentives to support capital investment and scale-up and regional data hubs. As the UK's relationship with the EU inevitably changes, a piece of analysis that must be considered alongside is the differential impact of leaving the EU on the regions of the UK. For instance, different regions throughout the UK receive different levels of funding for R&D, and some regions are disproportionately dependent on EU sources for R&D funding. The Life Sciences strategy should seek to take this into account.

## Contact

This submission was prepared by James Tooze at the Campaign for Science and Engineering (CaSE)

[james@sciencecampaign.org.uk](mailto:james@sciencecampaign.org.uk)

02076794995

[www.sciencecampaign.org.uk](http://www.sciencecampaign.org.uk)