

# A LOST DECADE

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## EXCITEMENT AROUND LIFE SCIENCES

Successive governments have lauded the life sciences as a pillar of the UK economy in recent years. David Cameron talked about “a jewel in the crown”. Theresa May set out her ambition to make Britain “the global go-to place for scientists, innovators and tech investors”. And Boris Johnson has already committed to ‘supercharge’ UK science following Brexit.

They are right to speak in such superlative terms. At the heart of the life sciences is a rare opportunity to achieve a ‘virtuous cycle’. At the start of the cycle are the patients whose outcomes are improved. Such improvements go on to make the NHS more efficient – either by enabling earlier intervention, or by preventing complications down the line. They also allow many who avoid disease to continue working and contributing economic value for longer. This value can be reinvested into more research, development and invention – beginning the cycle again.

In addition, it supports a sector important to the strength of employment, tax and social value in Britain. The life sciences are a hugely diverse sector - made up of researchers, manufacturers, pharmaceutical companies, university staff and many others besides. In total, it employs almost 200,000 people and supports 482,000 jobs (PwC 2015). In medicinal manufacturing, it has a worker productivity four times higher than the sector average. In 2015 alone, it provided £8.6 billion to the chancellor and £30.4 billion to the economy (ibid).

There is optimism around the potential for growth in the industry – driven in no small part by a uniquely exciting moment for scientific advances. Genomics has the promise to identify long-term conditions before they develop. Personalised medicine will ensure treatment efficacy far beyond what we can expect today. And this will be supplemented by doctors who, because of AI, have the time to care and the ability to much more fully support patient self-management.

## A LOST DECADE

The combination of exciting science, kind words from three successive prime ministers, and the importance of life sciences to the UK economy might tempt us to think the sector is exploding in the UK. However, new IPPR analysis shows

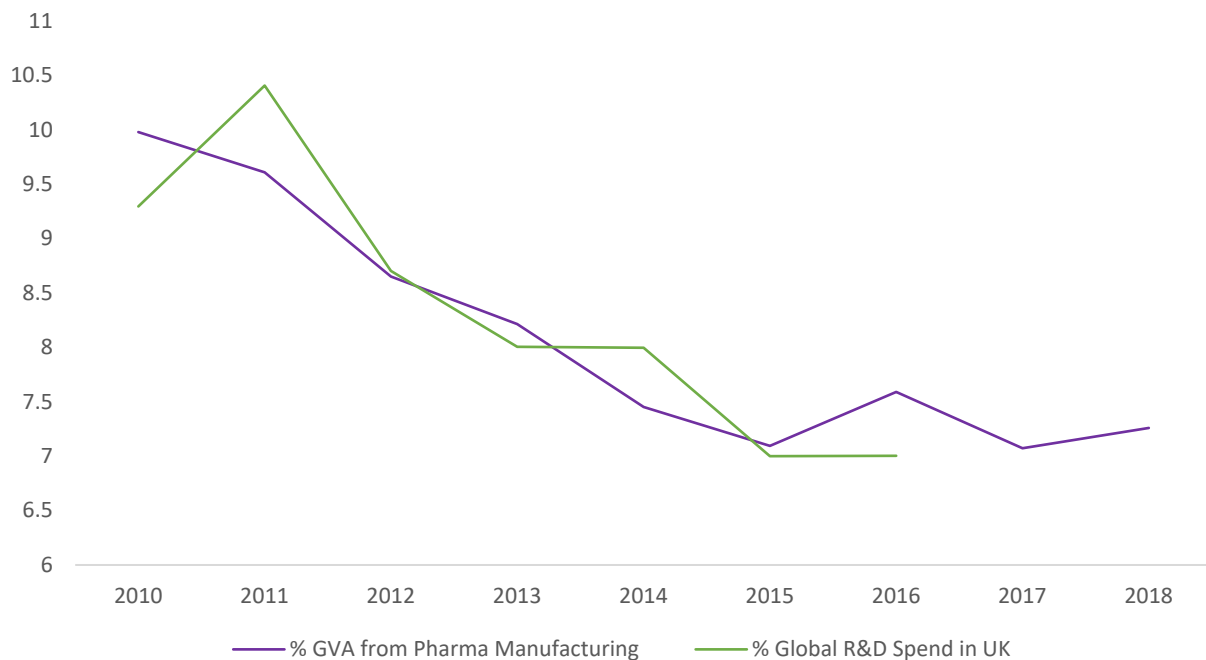
that is far from the case. **Indeed, it shows a lost decade that has left one of our strongest sectors stagnating, even before accounting for its significant vulnerability to an unmanaged, no-deal Brexit.**

In 2011, the UK attracted over 10 per cent of all life science R&D spend, globally. That meant for every £10 spent on life science research, £1 was spent in the UK. Similarly, pharmaceuticals made up 10 per cent of the gross value added by the UK manufacturing industry as a whole. In both cases, the trend has been towards stagnation since 2010/11, representing a missed opportunity to deliver progress against a backdrop of scientific advance (figure 1).

**Figure 1**

**The UK has lost a decade in progressing the life sciences**

*The change in life science global research spend (%) in the UK and life science GVA as a percentage of total UK manufacturing industry*



**Source: CF - Healthcare Consultancy and Analytics (2019)**

**In R&D, the total loss this graph represents is £15 billion in just six years (2011-2016).** Given the country’s investment in universities, world class research facilities and reputation for life science investment, maintaining performance would not have constituted an unrealistic ambition – making stagnation particularly disappointing. To put it in context, the USA’s share of the global market has risen from just over 50% to almost 60% in the same time period (ABPI, 2017). The gross value lost in manufacturing has been even higher. Had GVA contributed by life science manufacturing kept pace with the GVA contributed by the whole manufacturing sector between 2010 and 2018, **the gross value added to the UK economy would have been £29.5 billion.**

## A CLIFF EDGE

These trends make clear that – for all the government’s attention to the health innovation agenda – a trick has been missed. The consequences of this on patient care and wealth gains are large. Yet Brexit now presents a cliff edge to the life sciences industry that, without significant mitigation, will make it difficult to recover from a decade of stagnation or prevent a more substantial decline.

To date, Brexit has mostly impacted the sector by causing huge uncertainty in the UK market. The European Union makes the UK a more attractive place to invest in the life sciences. It allows freedom of movement for leading researchers, access to research funding, cross-border collaboration and common regulation for things such as clinical trials. The government has been less than clear whether it will maintain those benefits post-Brexit, or whether policy will take a sharp turn in a new direction. This, in turn, makes it hard to justify long-term UK investment in industries and by companies reliant on uncertain policy decisions.

It is likely that uncertainty will become tangible impact in the coming months, as Brexit negotiations reach their conclusion. The life sciences sector is particularly vulnerable for several reasons.

- **Trade:** Medicinal products are the second highest traded good in the UK – though progress has dipped since 2016. Over 40 per cent of all UK medicinal products go to countries in the EU, making life sciences particularly vulnerable to reduced EU market access (ONS 2019). Indeed, over £9 billion of trade involves medicine sales to Germany, the Netherlands and France alone (ibid). The trade disruption predicted by almost all government scenario plans and impact assessments would make the UK a difficult place to base manufacturing.
- **Programmes:** The EU is a funder of significant research programmes – including the Innovative Medicines Initiative and Horizon 2020. The latter has over £70 billion attached to it and the UK is a significant beneficiary of this scheme (see, for example, Full Fact 2016). Without access to this funding, the UK would lose significant appeal as a base for research and development.
- **Recruitment:** Life sciences rely on a wider talent pool than most industries. While finding many generalists is relatively straightforward in the UK, the kinds of specialisms involved in research require a larger talent pool. Not every town, city or country has a leading researcher into the intricacies of a specific DNA strand or malignancy. Freedom of movement and any changes to employment laws will make recruitment and progression significantly harder and, even with government guarantees, will likely both put investors off and disincentivise leading scientists from applying to posts in the UK, even if only because they perceive it will be more difficult.

- **Market Access:** Changes to trade will affect exports, with tariffs disrupting the market. It will also affect UK-based life science companies from importing and distributing – particularly if delays occur at Dover. This will be particularly significant for ‘just in time’ treatments with short expiry dates, and for treatments like hormone therapy which need refrigeration (HoC 2019).

These are major disincentives specific to life science investment and could turn stagnation into a full crisis.

## GAINS IN A POST-BREXIT BRITAIN

None of this should elicit fatalism about the future health and wealth contributions of the life science sector. However, maintaining it as one of our key strength sectors will now require more ambitious, and more urgently implemented, government policy and investment.

Fortunately, ambitious and comprehensive visions of what the life sciences sector of the future are not hard to find. The *Life Sciences: Industrial Strategy*, for example – written by a coalition of academics, charities and policymakers – advocates for a high-investment future. It makes a clear case for the increased UK investment - that brings our R&D spend to the top quartile of the OECD, creates new and exciting sectors around new product categories and gives access to the funding and technologies a thriving manufacturing industry need.

Economically speaking, there is currently every reason to make these investments to stabilise our economy against a hard Brexit. The Office for Budget Responsibility (OBR) predicts a no-deal Brexit would damage the economy to the sum of £30 billion per year (OBR 2019). There is broad consensus that other forms of Brexit would also damage the UK economy – albeit it to a lesser extent. This makes it more important than ever to maximise the potential of industries where we have a comparative advantage, and which can provide much needed economic stability. This is particularly true of the life science industries, many of which are clustered around geographies outside London – where the impact of Brexit is predicted to be most severe.

A relatively moderate scenario would be a return to the economic strength of the life sciences at the beginning of the decade – and its economic contribution during a recession and at the height of austerity. Matching our 2010 performance would deliver a gain worth £4.3 billion per year in R&D and £5.3 billion annually in manufacturing. **This totals £9.6 billion every single year and would make a significant contribution to stabilising the economy against a prospective no-deal Brexit loss of £30 billion per year** (figures 2 and 3). This kind of long-term gain would more than justify a short-term outlay.

## Figure 2

### There are large gains possible through research and development

*Worldwide and UK R&D spend by pharmaceutical and biotechnology companies, 2010-2016*

<b>Year</b>	<b>Spend in UK (£bn)</b>	<b>Global Spend (£bn)</b>	<b>Amount Lost (£bn)</b>
<b>2010</b>	9.49	102.1	-
<b>2011</b>	11.27	108.30	-
<b>2012</b>	9.39	107.9	1.8
<b>2013</b>	8.79	109.8	2.6
<b>2014</b>	9.18	114.8	2.7
<b>2015</b>	8.33	119.0	4.0
<b>2016</b>	8.88	126.8	4.3

Source: CF - Healthcare Consultancy and Analytics (2019)

## Figure 3

### There are large gains possible through manufacturing

*Pharmaceutical and total manufacturing gross value added, 2010-2018*

<b>Year</b>	<b>Pharmaceutical Manufacturing GVA (£bn)</b>	<b>Total UK Manufacturing GVA (£bn)</b>	<b>Total Lost Opportunity (£bn)</b>
<b>2010</b>	14.1	141.3	-
<b>2011</b>	14.02	145.91	0.57
<b>2012</b>	12.82	148.19	2.00
<b>2013</b>	13.00	158.27	2.83
<b>2014</b>	12.23	164.11	4.18
<b>2015</b>	12.15	171.25	4.97
<b>2016</b>	13.36	176.02	4.24
<b>2017</b>	13.14	185.78	5.44
<b>2018</b>	13.95	192.16	5.27

Source: CF - Healthcare Consultancy and Analytics (2019)

Beyond the present economic opportunity, the sciences have never been more exciting, suggesting the sector will have strong future growth. Investing in the infrastructure we need will put the UK in pole position to capitalise on the health and wealth gains of new advances, by becoming a hub for discovery development, production, implementation and export of them.

## FOUR TESTS POST-BREXIT

Importantly, the problems we uncover are not about the availability of policy. Ideas have been nothing if not forthcoming. *Innovation Health and Wealth*, the *Life Sciences: Industrial Strategy*, the Accelerated Access Collaborative and the emergence of the Academic Health Science Networks are just some of the examples of national strategies since 2010.

A significant problem has been the prospect of Brexit, which has created substantial uncertainty. Below we set **four key tests** for policymakers looking to take the requisite steps to mitigate Brexit, as part of a strategy to support and invest in our life sciences industry:

### 1. People

Our ability to deliver world class research is based on our ability to attract world class researchers. Traditionally, they have been drawn by the UK's excellent university system, and life science infrastructure. However, should immigration laws make it more difficult to live and work in the UK – attracting the best talent will almost certainly become significantly harder. Further, it will reduce opportunities for researchers in the UK to develop new skills and relationships abroad. Between 1996 and 2015, almost three-quarters of UK-based researchers spent time at a non-UK organisation (Cancer Research UK 2018a). As such, freedom of movement is important not only for attracting the best talent, but also for developing it.

**Test one: Post-Brexit, the staff critical to a thriving life science sector – including those active in the supply chain – should continue to have frictionless access to the UK. This will be measurable by consistent ability of universities, research centres and businesses to fill specialist roles with the best European candidates. Reciprocal arrangements for UK scientists should equally be pursued.**

### 2. Money

The European Union provides significant funding for life science research programmes and teams. Without a cooperation agreement between the UK and the EU after Brexit, which would be unlikely in the case of no-deal, UK scientists would lose funding and likely need to leave their research projects. Some have already reported a drop in EU funding via the Horizon 2020 fund (Jack 2017). The government has agreed to underwrite the Horizon programme where applications are submitted before Brexit, but this does not give a longer-term answer to where research funding and international collaborations will come from. Without this funding, businesses in the UK will lose access to some of the

world's most exciting research programmes – making the country less attractive for funders looking for somewhere to locate or invest.

**Test two: After Brexit, the ideal scenario would be an association agreement on full access to EU funding for UK researchers, such as Horizon 2020. Failing this, the UK should guarantee – as a minimum – to ensure life science research funding is made available that matches the average received by UK scientists from EU programmes.**

### **3. Regulation**

Life sciences are best when they are collaborative. This is particularly pertinent for medicine supply and for clinical trials. Should we lose regulatory alignment with the EU on medicines and clinical trials, it will hamper not only medicine supply, but also collaboration around large, international clinical trials. To give an indication of the impact, 28 per cent of the clinical trials Cancer Research UK run involve at least one other EU country (Cancer Research UK 2018b) – collaboration that could, potentially, end immediately. Equally, the UK currently is involved in many trials funded and run internationally, involving us in leading science and helping us give wider access to UK patients. To avoid this, we need regulatory alignment, close relationships between regulators and access to the new clinical trials directive. The latter is a digital system designed to improve speed and safety of trials – a system the UK currently lacks the infrastructure to replicate.

**Test three: The UK must deliver regulatory alignment on clinical trials and medicine standards, underpinned by close relationships between the UK and EU regulators. Access to the clinical trials directive digital system is also essential at the outset of, or shortly after, Brexit.**

### **4. Trade**

For life science businesses to base research and manufacturing functions in the UK, they must retain confidence in both imports and exports. Imports, because manufacturing requires highly specialised equipment and raw materials – delivered to time. Exports, because almost half of the UK's pharmaceutical trade is with countries in the EU – making tariff-free and consistent trade critical to the value proposition of developing and manufacturing a product in the UK. Should the eventual Brexit deal include tariffs, it will the UK a less attractive market for new drugs. It will also strengthen any business case to relocate existing infrastructure from the UK.

**Test four: Brexit must not lead to new tariffs on life science products. It must also avoid creating sustained delays to supply chain of life science companies working in research and manufacture.**

It is further crucial that the government prioritises the interests of the NHS and life sciences sector in any ongoing EU negotiations. In planning for post-Brexit disruption, these should also constitute two of the most important priorities – particularly given the documented impact Brexit may have on medicine supply. After leaving the European Union, the government should look to ensure

regulatory alignment, easy recruitment and strong international collaboration as a priority.

Mitigating Brexit alone will also not constitute optimising our approach to life sciences. This will require fuller and faster implementation than the government is currently achieving – particularly on the life sciences industrial strategy. The current bit-part approach has made our approach to the sector less cohesive and complete than it could be.

It will also mean making the NHS a more active part of the innovation process. Currently, the health service struggles to fairly distribute the best new treatments, care and digital tools to patients. To present ourselves as a hub for the best new science and medicinal research, it will be important that we have a health system that can implement advances efficiently and fairly. This is important for maximising patient gain, but also in ensuring the UK market is transparent and predictable for both innovators and service users.

## CONCLUSION

This new analysis provides a clear course for action. Firstly, we should be doing a lot better in life sciences. The data shows that we end the 2010s having experienced a loss decade, where government policy has not been implemented fully or quickly enough to substantiate growth and wealth gains. We now stand at a Brexit cliff-edge, making action more critical than ever.

The flip side of this is that we subsequently have a significant opportunity to seize economic benefit. Should Brexit happen, particularly in a no-deal form, our economy will need to rely on strength industries like life sciences to stabilise. If the government moves to mitigate Brexit, implement the life sciences industrial strategy with more urgency, and make the NHS a more active partner in innovation, these gains are as possible as they are important.



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