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## The UK's dream of becoming a 'science superpower'

Ministers want to supercharge the £89bn life science industry. But it will take long-term thinking on investment, talent and infrastructure

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Raquel Carvalho of Wild Bioscience with wheat plants in the growing room at the company's headquarters in Abingdon, Oxfordshire © Tom Pilston/FT

Like many environmentally conscious twentysomethings, Ross Hendron is determined to help save the planet.

The difference is that Hendron, a former Oxford university plant scientist turned start-up entrepreneur, has a real-world plan to make a difference. His dream is taking shape

under purple lights in a science lab on the outskirts of the city, where genetically modified wheat crops are being prepared for real-world seed trials early next year.

The idea behind Hendron's nascent company, Wild Bioscience, lies at the intersection of molecular and computational biology. It identifies individual genes in wheat and then activates them to create "wild-enhanced" varieties that grow faster and bigger with less water and nutrients.

"Farmers are on the frontline of climate change and we're giving them the tools to sustainably feed the 8bn people on the planet," Hendron says.

Wild Bioscience, which was founded with £12mn in seed capital in August 2021, is one of the hundreds of life sciences and biotech companies that emerge from the UK's potent academic science base every year.



Ross Hendron, founder of Wild Bioscience, a company he hopes will eventually help provide farmers with the tools to sustainably feed the 8bn people on the planet

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It is exactly the kind of company that the British government believes can help turn the UK into a globally recognised hub for these industries, one of its pillars of economic growth under plans announced by chancellor Jeremy Hunt in the autumn. George Freeman, the UK's minister for science, research and innovation, tells the

Financial Times that the government’s “entire mission” is to shift the UK from being an “academic powerhouse to a science superpower”.

Yet beyond the soaring rhetoric, difficult questions are being asked about whether the financial, regulatory and physical architecture is being put in place to realise that ambition.

“The UK is very good at building companies,” says Alexis Dormandy, a serial start-up investor and the former chief executive of Oxford Science Enterprises, the investment company that backs businesses like Wild Bioscience. “The still unanswered question is whether we can build industries?”

Sir John Bell, regius professor of medicine at Oxford university, is among those fretting that the UK is not doing enough to seize the opportunity. Bell helped develop the AstraZeneca Covid-19 vaccine and authored a 2017 life sciences industrial strategy calling for the government to back “moonshot” projects.

“We’ve got lots of spinouts, in EU terms, by far the most products under early development, the question is why we haven’t got a Boston or San Francisco-level cluster?” he says, referring to the US life science hubs.



Alexis Dormandy, former chief executive of the investment company Oxford Science Enterprise, says that the UK knows how to grow companies, but it is unclear if it is up to building industries

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“If you were to add up all the companies in Oxford, Cambridge and London, you might almost equal Boston in number, but in terms of market capitalisation, it is only a fraction.”

The challenge of scaling up companies from tiny start-ups to multibillion-dollar “unicorns” is multi-faceted, requiring a combination of long-term investment, access to talent and physical infrastructure, such as wet labs, schools and housing.

Many in the industry say Westminster could be doing more to create a sustainable ecosystem in the UK. The decision by the government to scale back its research and development tax credit scheme in the last budget was condemned by the biotech industry in particular, whose members have relied on this incentive to grow.

At present, far too many UK start-ups get sold off just at the point where they are starting to have proven revenue streams, says Dormandy, who calls the UK a low-cost “technology sweetie shop” for the world.



London Stock Exchange chief executive Julia Hoggett suggests that the UK struggles to seize the opportunities its start-ups offer

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“More often than not they are acquired for hundreds of millions by companies in the US and Asia. The founders pat themselves on the back, partners at venture capital

firms pick up their ‘carry’ cheques, and we collectively celebrate our success. But that’s exactly the moment we need to be asking how we build billion-dollar companies, and after that, ten-billion-dollar companies.”

“We’ve got lots of start-up fuel,” adds London Stock Exchange chief executive Julia Hoggett. “But we’re not running the engine.”

## **Crossing the desert**

Despite bleak economic headwinds, the UK government is sticking with its ambition for the country to be a “science superpower”. At a recent cabinet meeting, ministers were asked to come up with strategies around science and innovation, according to a person in the room.

But some exhibited frustration with the lack of concrete policies, highlighting that too often the government is better at producing blue-sky strategies and white papers than policy and action.

This life sciences strategy, unlike some of the other priority areas such as artificial intelligence and quantum computing, has at least been consistently backed through various permutations of Conservative government.

During his time as prime minister, Boris Johnson repeatedly made life sciences a priority in the post-Brexit, post-lockdown economy, offering help to companies to commercialise medical breakthroughs.

He was keen to trumpet the regulatory freedoms and opportunities now that the UK has left the European Union — and saw the potential economic benefit of putting government cash to work in this area.

It also fit Johnson’s prized strategy of “levelling up” different parts of the country. Life sciences and biotech is an industry that has put down roots across the UK, with a growing Yorkshire and the Humber medtech cluster, for example. According to government data, the UK life sciences industry employed 268,000 people across 6,330 businesses and generated a turnover of £88.9bn in 2020.



Sir Jonathan Symonds, chair at GSK, says that British institutional funds are missing out, adding that 'overseas pension funds are bigger in UK life sciences than the entire UK pension industry'

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More than four in five are small or medium-sized businesses, underscoring the importance of start-ups and scale-ups to the industry, although the large global pharmaceutical companies with activity in the UK still occupy the largest share by turnover and staff. Between 2011 and 2020, the industry increased employment by 31,500 people.

Sir Jonathan Symonds, chair at GSK, helped draw up the government's life sciences strategy last year aiming to build on the successes of the pandemic response. Central to the strategy was creating a business environment in which UK life sciences companies can access finance to innovate and grow.

Symonds, co-chair of the external advisory board, says one of the areas that the UK needs to focus on is "scale-up capital" — the money needed to get start-ups to the level of growth required to commercialise and manufacture products at scale — to help those businesses stay and grow in Britain.

The pressure on start-ups to sell out to deep-pocketed overseas investors is great, says Gordon Sanghera, the chief executive of Oxford Nanopore Technologies, a £2bn

London-listed business whose DNA sequencing technology is used in molecular-level sensors in myriad fields including clinical diagnostics, epidemiology and food safety.

He recalls the sale of Cambridge-based gene sequencing company Solexa to the US company Illumina in 2007 for \$600mn. It was widely hailed as a great triumph for the industry, but to Sanghera and his chief technology officer Clive Brown who had helped build Solexa, it was a sellout. “It felt like a prospector giving his land just after he had struck gold,” he recalls.

“That’s where the UK model is completely broken,” says Sanghera. “A company is offered £500mn to be acquired by a US company and everyone cheers. But why don’t we say ‘no’ and go and get the top talent and say, ‘Let’s make it a £5bn company.’”

But Sanghera acknowledges that achieving this is not easy. He describes making the leap from spinout to fully-fledged company as “like crossing the desert”. It is easy to raise money in the early and latter stages, the hard part is filling the gap in between.

The first challenge is finance, or scaling capital. As Bell puts it: “There is no appetite to dig deep in a series B [round] where investors pony up \$200mn in \$50mn lots to do the clinical trials, to show a device works. It doesn’t really happen very often in the UK, or in Europe.”



Sir John Bell, regius professor of medicine at Oxford university, believes the UK needs to do more to seize commercial opportunities © PA

Founders say that most of the venture capital cash willing to take the bets on risky start-ups comes from US funds, or from pension schemes in Canada and Australia, with UK investors loath to use pensions money to take risks on early-stage, riskier firms.

“Virtually 100 per cent of venture capital is from the US which means when the big decisions get taken about where they go next, these decisions are led by people in the US,” says Symonds.

One answer could be to deregulate the UK pension system which, since it shifted overwhelmingly to defined-contribution schemes, has become overly fractured and institutionally risk-averse. Oxford Nanopore had investment from the funds of Texas

teachers or Ontario teachers, says Sanghera, but “UK teachers are nowhere to be seen.” Symonds recently led a roadshow for UK institutional funds to “show them what they are missing” given that, for many, there is no recognised alternative asset class through which they can invest in the sector. He noted that compared to UK funds, which choose between equity or bonds, overseas pension schemes, such as those from Canada, give more than 40 per cent of their allocations to alternative assets.

“These overseas pension funds are bigger in UK life sciences than the entire UK pension industry,” he says. “US venture funds come to the UK to set up shop and be close to the frontier of UK science.”

## **Helping hands**

The scale-up gap is one of the areas that a government-backed capital market task force led by the London Stock Exchange’s Hoggett is seeking to address.

The UK is “great at the ‘R’ and not so good at the ‘D’,” she says. “It’s really making sure that we connect the D and that we have the right ecosystem.”

She adds: “It’s about making a pathway and making it more straightforward to know how to get on to it and trying to figure out how to drive it even more. Because we have brilliant research in this country. We’ve got a greater volume of world-leading universities than our fair share.”





Gordon Sanghera, of the £2bn London-listed Oxford Nanopore Technologies, says it is easy for companies to raise money in their early and latter stages, the hard part is in between

© Andrew Fox/FT

Freeman, the science minister, says the UK has an opportunity to build a new system post-Brexit. “Our EU membership led to the servicification of the British economy, which meant we neglected domestic reform because we sort of could,” he says. “Now there’s nowhere to hide.”

The country must no longer act as if it is just a life science gateway to Europe, he says, and find new ways to prosper by focusing on releasing funding — using the NHS as a regulatory “sandbox”, for example, and driving UK exports in selected areas such as space technology and autonomous vehicles. The government has also committed to an increase in public R&D spending to £22bn a year by 2024-5, and a significant proportion of this is expected in life sciences.

In 2021, ministers agreed a long-term investment agreement with Abu Dhabi’s Mubadala Investment Company, the emirate’s sovereign investor, that will see an initial £800mn committed from Mubadala to invest in UK life sciences over five years. The UK will add £200mn through a life sciences investment programme.



The Canary Wharf Group has committed to building the largest ‘wet’ lab in Europe in a tower on the east London estate amid a scarcity of laboratory space in the UK and global competition for talent  
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The state-backed British Business Bank is overseeing the fund. Catherine Lewis La Torre, chief executive of its British Patient Capital arm, says that the bank’s core funds had invested more than £150mn in life sciences in the UK.

Analysis carried out by the bank last year found that the funding situation for the sector had improved in the UK, but that other countries had also stepped up their efforts.

“Our position relative to the US hasn’t moved at all. And that gap is pretty substantial,” she says. We don’t pretend that we have enough firepower to really solve that market failure. The big question is to what extent can we attract other investors into this space?”

The scarcity of laboratory space is another pressing issue, especially in science clusters such as Oxford and Cambridge where many start-ups emerge from.

This is an area where the private sector can make a real difference. Shobi Khan, chief executive of Canary Wharf Group, has committed to building the largest “wet” lab in Europe in a tower on the east London estate.

“A lot of great companies are here, there’s a lot of discovery here. And that field is growing. And we think we should have exposure to it. Our vision is to build a significant life science campus here at Canary Wharf.”

But he added that the UK could not rest on past successes. “We’re in a global world, you know, so companies have choices of going to London, or Boston or Singapore or anywhere in between. It’s a global competition for talent.”

### **‘We don’t want to cash out’**

Whether the UK can produce a globally significant cluster of life science industries — as it did for financial services back the 1980s and 1990s — will depend upon assembling a critical mass of human and financial capital, alongside the physical infrastructure needed to realise the ambition of becoming a true “science superpower”.

Hendron at Wild Bioscience says his desire is to emulate the likes of Oxford Nanopore, stay put in the UK and grow into a business with a reach and scope that can truly make a difference. But he knows there are choices.

He says his own business “very nearly” set up in Belgium’s agritech cluster surrounding the VIB (Flanders Institute for Biotechnology), where business development talent, as well as tax breaks, grants and glasshouses combine to create an ecosystem to attract the very best in the world. But Hendron ultimately decided to stay in the UK, bringing on VIB-based and US talent to help develop the company.





The headquarters of biopharmaceutical company Genentech in San Francisco. The company was founded in 1976 and went on to spawn an entire industry © Smith Collection/Gado/Getty Images

Hendron is still in the foothills of his journey, but has the kind of ambition that Sanghera at Oxford Nanopore demands. “We don’t want to cash out,” he says. “We see this as a sustainable big business. We’re finding we can come up with successive ‘hits’ and we want to keep doing that, get on the scoreboard with a product and then use that to start funding some of the other fun stuff.”

No one knows if Wild Bioscience will make it across the desert. Plenty of ambitious start-ups perish in what venture capitalists call the “valley of death” as they fight to make the transition from cash sink to revenue generator, but Bell believes that even one truly successful company could make the difference.

“Look at the impact of Genentech,” he says, referring to the San Francisco-based biotechnology franchise that was founded in 1976 and went on to spawn an entire industry.

“If you go to that part of the world, almost anyone who is anyone in that field has been in and out of Genentech. We need to think about how Genentech was successful. Basically one really successful scaled company can feed a whole ecosystem.”



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