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Life science is one of the sectors picked out for major growth in the West Midlands' Local Industrial Strategy (LIS): but how can we get more local businesses to scale up while attracting big brands to the region?

SIGNS OF LIFE

Rarely has illness been in better shape: life science is already worth about £4bn to the West Midlands' economy, creating about 11,000, usually very well paid, jobs in about 400 businesses.

Little surprise then that it has been identified by Greater Birmingham and Solihull LEP (GBSLEP) as one of the four key sectors for growing the West Midlands' economy. Yet although life science can offer huge rewards if the region can nurture its growth, there are major challenges in promoting its expansion.

THE SECTOR

The greater Midlands is reckoned to be the second biggest region for MedTech, third for life science and the biggest for specialist health services.

The life science cluster, specifically in the West Midlands Combined Authority (WMCA) area, is centred on some strong existing assets, all close to each other: the Queen Elizabeth Hospital – one of Europe's largest; Birmingham Women's Hospital; the city's BioHub the University of Birmingham and the Institute of Translational Medicine.

These are soon to be joined by the £200m Birmingham Life Science Park


Pam Waddell

development, a ten-acre development at Birmingham University.

Work on developing the park is due to start in early 2020.

However, life science in the Midlands is equally blessed and cursed by being a diverse sector. Unlike, say, automotive or aerospace, which are ultimately dominated by a few top customers like Jaguar Land Rover and Rolls-Royce which set the agendas for the supply networks for their industries, health is a far more complex sector, with many different customers. Even the mammoth NHS does not dominate development, growth and investment in the way many would expect.

"The NHS is not this single entity, it is not a huge star around which all things orbit," says Tony Davis, director of innovation at the West Midlands Academic Science Network. "It's actually a very fragmented organisation, more of a brand than a body, with different parts having their own agendas and cultures. Some parts of the NHS are very prepared to take risks while others are highly risk averse. Some parts work willingly with the private sector: others are very wary of it."

THE PLAN

In mid-2019 the GBSLEP published its Local Industrial Strategy (LIS) which laid out what it saw as the region's main potential growth industries, including life science. However, those compiling the strategy felt the region needed to be very specific in the life science areas it wanted to develop if it was to really attract funding, investment, government support and skills. So it focused on four particular aspects: genomics medicine and diagnostics; clinical trials; medical technologies evaluation and data-driven healthcare, and digitisation of healthcare services. "The strategy has to be specific to the area," says GBSLEP chairman Tim Pile. "If we just say 'we do life science' and put out a wish list we'll get nothing. Like every other region, what's to distinguish us from Manchester or Cambridge? We have to concentrate on our sweet spots, and focus on those areas which combine legacy and opportunities."

In this context the areas on which the West Midlands is focusing starts to make more sense. For example, the region's industrial heritage means a natural bias towards medical technologies; its ethnically diverse population makes it a natural test bed for clinical trials and genomics; its drive to embrace digital technologies gives it an edge in data-driven healthcare.

At the core of the LIS is the phrase "translational medicine": it's a broad-brush term for a broad-brush approach to life science that means drawing together different branches of healthcare to speed up the discovery and implementation of new diagnostic tools and treatments, and make sure they actually get into the community.


Dr Anne Coufopoulos

"The development of life science will depend on more than just what strengths we have in specific areas of healthcare," says Pam Waddell, director at the Innovation Alliance for the West Midlands.

"For example, data is a growth area in the Midlands in sectors like transport, energy and construction. So the real areas of opportunity in where these intersect; how do you take something learnt or developed in, say, transport and apply it to healthcare? Life science does not sit in isolation."

GROWING OUR OWN

One of the challenges that life science faces in the West Midlands is growing great local ideas into European or even globally-sized players.

The business usually cited as the great success story is life science company The Binding Site, which provides specialist diagnostic products to clinicians and laboratory professionals worldwide.


Tony Davis

It began in the 1970s as a startup in Birmingham and has grown to a £34m turnover endeavour employing 700 people.

Yet when it comes to getting to the big time, The Binding Site stands alone as the region has hundreds of brilliant bespoke life science businesses that fail to scale. The vast majority achieve success by developing their ideas to the stage where they are tested, even marketable – then sell their intellectual property (IP) to a larger player.

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> director of innovation, West Midlands Academic Science Network

"There is nothing wrong for a company to develop its IP and then let another business take it to the next stage of commercialisation, particularly in life science," says Philip Cupitt, senior patent partner at patent attorneys Mark & Clerk. "The person who comes up with the idea is often not the best person to get the funding, take it through testing, the regulatory process and then to market. Selling the IP to a larger player is not a bad thing: it's just the lifecycle of much of the sector."

The main reasons for failure to grow world-scale life science businesses in the Midlands can be summed up in three words: certificates, cash and culture.

Life science is a highly regulated sector,

USING OPEN SOURCE SOFTWARE TO IMPROVE HEALTH OUTCOME

Coventry University research is looking to transform hospital care in the NHS through the principles of open source software

It is estimated that seven per cent of in-hospital deaths that occur in the NHS are preventable, with additional patients experiencing unnecessary deterioration. One of the reasons for this is ineffective paper or digital systems for observing and managing patients. The current systems are expensive for the NHS and often do not integrate well with other clinical systems.

Coventry University's Centre for Intelligent Healthcare is collaborating with open source software integrator OpusVL and a number of NHS organisations to look at transforming the NHS's observation and monitoring systems, using new technology and the principles of open source.

The collaborative 'Develop in the Open' (DITO) project aims to create a blueprint for clinician-led open software in the form of an app, suitable for the NHS and other public sector bodies.

Open source software allows for adaptable, community-based technologies. The software design, documentation and all associated components are made available to the community to be studied, re-used and further developed.

This open and collaborative approach is equally applicable to businesses for the automation of administration and accounts as well as sales, purchase, stock and logistics.

The open source approach taken through DITO will see developers supported by academic research and service providers, and processes will be in place to ensure the governance, security and quality of the applications. It is hoped that this will provide more functionality and the flexibility to adapt to the changing needs of patients and clinicians, while reducing the NHS's annual software licence renewal bill.

To confirm the potential benefits of creating software using the principles of open source, an application that assesses the National Early Warning Score (NEWS2) will be created and tested. The NEWS2 score is a key predictor of sepsis in hospital patients, which claims the lives of an estimated 52,000 people a year in the UK. Earlier identification of sepsis leads to better patient outcomes and reduced mortality.

A practical study is taking place with doctors and nurses to help inform the development of the app. This has included a literature review to evaluate current NHS working practices and collate feedback on digital systems. Information from the practical study will be used to implement a best practice approach in the app, which will be tested in Coventry University's cutting-edge patient simulator facilities. The final stage of the project will be field trials at hospitals in two NHS trusts.

DITO is led by OpusVL, with Coventry University providing the academic expertise. Also supporting the project are NHS organisations, including South London and Maudsley NHS Foundation Trust, Cheshire and Wirral Partnership NHS Foundation Trust, The Apperta Foundation CIC Trust and OpenUK . Innovate UK has awarded the team a £790,000 government grant, the largest sum they have ever awarded to an open source project.

For more information visit dito.tech or contact Nikki Holliday, Design Manager at Coventry University nikki.holliday@coventry.ac.uk

and this regulation acts as a barrier to investment and growth as it costs a lot of time, money, testing and paperwork to have an innovation stamped by a plethora of bodies and approved for the market.

The second is cash, or rather the lack of. Funding for even the most exciting innovations is hard to come by and often takes a great deal of effort to source. Investors are put off by the sector's complexities and a risk-reward calculation very different for those in other industries. While a successful life science business can produce big returns, they work in a risky sector and one in which payback can be eight or ten years – two to three times what many investors would see as acceptable, and far longer than many would be prepared to wait.


Martin Levermore

"Often they are only interested in what they can get quickly, not anything which takes ten years to develop," says Adam Layland, associate dean of enterprise & innovation at Coventry University.

Even the LIS admits: "There is a critical need to de-risk innovations in diagnostics, software and devices."

"There is a huge aversion to risk when it comes to funding life science," says David Coleman, head of enterprise acceleration at University of Birmingham Enterprise. "There is not as much funding in this country as there is in other parts of the world. We struggle hard to get £150,000, far more than it would take a similar firm in the US to raise $1-2m.

"There are few specialist life science funders like venture capital trusts. And those in the game tend to invest in safer parts of the sector, such as medical technology. That lack of money, and the effort needed to win what there is, means companies are constantly de-risking, preparing themselves for the next funding round, rather than building the business and its offering."

The region has been successful in winning government grants and won some £30m from Innovate UK in the last two years for life science, against pretty fierce competition. Yet there are claims that the grant funding structure distorts business plans and skews direction.

Culture also presents a formidable challenge: there is widespread feeling that business leaders, clinicians and academics do not understand each other's needs, and what each has to offer. There are proposals in the LIS to establish a regional Translational Med-Tech Commission – a body that will bring together civic leaders, the government, universities, entrepreneurs and startups to advise on how to accelerate commercialisation around a 'lab to patient' ecosystem.

"There does seem to be a big disconnect between the academic, commercial and clinical spheres," says professor Martin Levermore, chief executive at Wolverhampton's Medical Devices Technology International. "The Midlands is great at coming up with ideas, but I often find myself having to go out of the region to places like Sheffield and Manchester to get the people needed to make things happen. It's all the more frustrating because I know the skills I need are here, yet people seem to work in silos."

"One of the challenges is the accessibility of small companies to what's available at universities: how can their ability to tap into the existing resources and research at universities is not always seen as accessible," adds Dr Anne Coufopoulos, director of product, enterprise and innovation at Coventry University. "There needs to be better signposting and greater clarity as to what each has to offer. There is often a lack of understanding from businesses on how to access what universities have to offer and indeed what is there for them to access."

There are also concerns that what is being produced by cutting edge research in the region and what is needed by the market often do not match up. "The region's universities are working on research programmes that have a number of USPs: but I'm not sure that we have many USPs from an industry point of view – it's too widespread, too diverse. So that often makes it difficult to marry the two together," says Richard Stone, chief executive of Medilink WM, the sector's representative body in the region.

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> **Pam Waddell**
> director, Innovation Alliance

"It's often claimed we should respond more to what innovators are doing. I'd argue we need to do it the other way and allow innovators to understand more about what the market need is," adds Waddell. "Funding should not be adapting to what innovators are making, but to where the demand is. You can fund companies left, right and centre but unless there is a demand you will not create a viable business."

LOOKING OUT FOR A HERO

Unlike the East Midlands, which historically has been home to big players such as Boots, BASF and Reckitt Benckiser, the West Midlands has had no big "hero brands" in life science which attract investment and skills, and give birth to a cluster of daughter companies.


David Coleman

And, until the Birmingham Life Science Park starts receiving tenants, it does not have anything to rival Nottingham's BioCity as an incubation hub for health businesses.

Pile says that winning big names to invest in the West Midlands will be an important step in developing the region's life science sector as they act not just as magnets of talent and staff, but as flagships which will draw in other businesses. "It is one of our biggest weaknesses," he admits. ■