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# THE DEEP TECH SME ECOSYSTEM SUPPORTING RESEARCH-INTENSIVE CHEMISTRY SMES FOR GROWTH



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**Innovation is a vital driver of growth and the answer to global challenges, such as improving health and tackling climate change. To unleash this potential, the innovation ecosystem of research-driven businesses needs support from a range of stakeholders, in addition to Westminster. The Royal Society of Chemistry (RSC) is working to shine a light on the social, environmental and economic value of deep tech chemistry and bring it into focus for policy and investment.**

In the Autumn Statement 2023, Chancellor Jeremy Hunt said that “the best universities, the cleverest scientists and the smartest entrepreneurs have given us Europe’s most innovative economy”. It is fantastic that these are the strengths he chose to highlight, and a testament to the cutting-edge research done in academia and SMEs around the country.

The chemical sciences underpin much of this research work, and will provide the answers to global challenges we face in fields as diverse as energy

and net zero, secure food and water supplies, and population health. Many of the companies developing these technologies and taking them to market fit the definition of a Deep Tech SME – a small or medium-sized company developing new and potentially disruptive chemical technologies with long and uncertain R&D timelines and high capital requirements. The RSC has worked to understand the situation, strengths and challenges of these companies so we can take action to support them in their mission to make the world a better place, using

our research with the Enterprise Research Centre set out in our 2022 report *Igniting Innovation*<sup>1</sup>.

## CHEMISTRY DRIVING INNOVATION

Figures from the 2019 UK Innovation Survey<sup>2</sup> show that chemistry SMEs are twice as likely as the average SME population to invest in R&D (39% vs 20%), more likely to bring new-to-market innovation (16% vs 9%), and more likely to train staff for innovative activities (21% vs 13%). They are also more likely to collaborate with partner organisations, particularly

universities, showing they are active in the translation of publicly funded research into beneficial products. However, the nature of chemical research means these companies also face unique challenges on their journey to commercialisation. The RSC is working to address these challenges, as detailed here.

Laboratory research, extensive testing, and scale-up of production capacity are all expensive. However, for a deep tech chemistry SME they are all necessary before a minimum viable product can be reached and the company can become revenue-generating. This leads to challenges in seeking investment as these up-front costs must be paid before any chance of generating a return. The RSC encourages government to increase the early-stage grant support available for deep tech innovation as well as other methods such as co-investment to de-risk these companies in the eyes of private capital.

Scientific expertise in the financial sector is limited, meaning analysts advising on investment decisions are not always best-placed to understand the detail and the potential of the technology they are presented with; a further barrier to successfully attracting funding. The RSC brings high-potential emerging companies to the attention of investors through our Investment Catalyst events, and uses our scientific understanding to act as a kitemark recognising the most promising innovation.

As well as the cost of chemical research, it also requires bespoke equipment and facilities. Finding these available for commercial use at an affordable rate can be very hard, particularly in areas without an established research SME sector. Smaller companies and early-

stage university spin-outs can sometimes access university equipment, but as the need to grow increases finding facilities can be harder. The needs of each company can be very specific so there is little incentive for landlords to pre-fit premises at great expense, but existing lab space is oversubscribed even in places with well-established innovation clusters like Cambridge. We are working to audit and map available facilities as well as promoting the building of more lab space suitable for deep tech SMEs to grow and thrive in.

Chemistry SMEs are often founded by scientists with the intent of commercialising their research. However, the skills needed to create a successful business are different to those needed to be an effective researcher. In many cases, SMEs struggle to develop strong leadership, management and business skills. Training and partnership opportunities are available in some cases, but this takes time and money away from the research that is the core of the business. The RSC acts as a hub for peer to peer networking, sharing these necessary skills and learning from seasoned entrepreneurs. We are also active in the conversation with government and arms-length bodies on the skills needed for the future UK workforce and how scientists can be trained to add them to their technical knowledge.

Innovation flourishes in clusters, where many companies at different stages of the innovation journey can share knowledge and best practice, find economies of scale and, if companies do fail, scientists and entrepreneurs working in that ecosystem know they can find new jobs. For chemistry, there are not enough mature networks to make these advantages

widely available, particularly away from the “golden triangle” of R&D activity in London, Oxford and Cambridge. The RSC works with scientists, universities and companies around the UK and globally, and advocates to decision-makers for policy decisions beneficial to local R&D business growth across local communities.



Alex Groombridge, Chief Technology Officer and a founder at Echion Technologies holding their fast-charging battery prototype.

## THE RSC WORKING FOR CHEMISTRY START-UPS

The home of this activity within the RSC is Change Makers, our entrepreneurial ecosystem for deep tech chemistry SMEs<sup>3</sup>. This is a home for any SME working on chemical technologies that aid the UN Sustainable Development Goals (SDGs)<sup>4</sup>, as well as investors specialising in deep tech companies and selected mentors who can pass their skills and knowledge on to those at an earlier stage of the deep tech commercialisation journey.

This initiative has grown from a history of support for chemistry SMEs by the RSC. We have, over the past decade, worked with more than 600 companies who have collectively raised more than £3.5bn in funding through grants and investment. Some SMEs identified by the RSC as “ones to watch” have gone on to achieve exits in the range of

hundreds of millions to billions<sup>5</sup>, while others have achieved notable successes such as Notpla winning the 2022 Earthshot prize.<sup>6</sup>

## POLICY ACTIVITY TO SUPPORT INNOVATION

The RSC is not, of course, working on this topic in a vacuum. The Government has over the last few years made policy changes and investments aimed at boosting innovative UK companies through several different vehicles and initiatives. We have seen the welcome announcement of new funding streams for investment in science and technology companies, particularly where it can crowd-in investment from private partners. This is aimed at companies with more mature technologies that have demonstrated their potential. Innovate UK funding helps more nascent companies with grants for proof-of-concept work and early development. Support for levelling up through innovation clusters and regional support for R&D businesses centred around universities are positive steps for building networks of innovative SMEs. Other financial tools relevant to innovative SMEs include R&D tax credits, particularly where companies are pre-revenue, and financial help from Tech Transfer Offices if companies are being spun out from university research.

Other, non-financial, policy areas affect SMEs. Companies need the talent to conduct their research and turn a product into a business. This can involve hiring specialist scientists from global talent pools, so immigration policies and a climate which attract a range of scientific talent are of great importance. Skills and education decisions also affect the domestic supply of graduates and workers. Government weight behind particular

technologies and areas of research strength can boost interest in companies working in these areas, driving investment chances. Locally devolved policy such as business rates, planning decisions and local infrastructure are also critical to providing an environment for innovative SMEs to flourish.

In conclusion, we encourage those in the political sphere to

celebrate the contribution that deep tech chemistry and other R&D-driven SMEs make locally and nationally, and to recognise the capability of innovation and deep tech chemistry to bring economic and societal improvements. Innovation policy requires joined-up thinking and inclusion of the sector's voice from the earliest stages of development. We, and the

entrepreneurs at the heart of deep tech chemistry, stand ready to drive UK growth through the strength of our innovation.

#### References

1 *Igniting Innovation*, RSC, 2022, <https://www.rsc.org/policy-evidence-campaigns/discovery-research-and-innovation/discovery-research-innovation-reports-surveys-campaigns/the-case-for-supporting-uk-deep-tech-chemistry/>

2 *The UK Innovation Survey 2019*, BEIS, <https://www.gov.uk/government/statistics/uk-innovation-survey-2019-main-report>

3 <https://changemakers.rsc.org/>

4 <https://sdgs.un.org/goals>

5 Ziylo (bought by Novo Nordisk), Exscientia (floated on Nasdaq)

6 <https://earthshotprize.org/winners-finalists/notpla/> ■