

# BIOTECHNOLOGY CLUSTERS

Report of a team led by  
Lord Sainsbury, Minister for Science

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# Preface

Taking as our starting point the Government's Competitiveness White Paper "Our Competitive Future: Building the Knowledge Driven Economy"

I was delighted to lead a team on a fact-finding mission looking at biotechnology clusters.

The growth of biotechnology clusters is an exciting development, but this is the first time that an attempt has been made to undertake a more systematic analysis of what contributes to success in this sector, and what the barriers might be to further development.

Government must do all it can to support the success story of the UK biotechnology industry and ensure that we maintain our lead in Europe. We have succeeded in creating many small biotechnology companies. The challenge now is to see them grow into established businesses. Building successful clusters requires concerted action across a range of policy areas from supporting the science base to encouraging the flow of venture capital into companies and having urban planning policies that allow clusters to grow.

I believe this has been a timely examination and I hope that it will be helpful to Government and others in determining and implementing future policy in this area. Whilst this report concentrates on biotechnology clusters, many of the ideas we suggest for supporting cluster development could apply equally to clusters in other industrial sectors. We have therefore recommended that further work is undertaken to better understand the importance of clusters throughout the economy.

I should like to thank the team of experts who assisted me in the visit programme and in producing this report. On behalf of the team, I would like to record our gratitude to all those who contributed to our visits in the UK and the US, and would like in particular to say how much we appreciated the assistance provided to us by our consulates in Boston and Seattle.

Lord Sainsbury of Turville, Minister for Science

# Executive Summary and Recommendations

This report draws on a fact-finding mission to examine biotechnology clusters in the UK.<sup>1</sup> The UK leads Europe in biotechnology, although it is still some way behind the US.<sup>2</sup> The report builds on the work of Michael Porter and others<sup>3</sup> which show benefits to start ups and SMEs from being located in a cluster. The UK has achieved much in building biotechnology clusters in some areas and creating a supportive environment for biotechnology start ups, and we aim to capture and spread best practice about cluster development. The report also aims to better understand how Government and others may further support cluster development to enable UK biotechnology companies to meet new challenges. The next few years will be critical ones which will determine how many start-ups grow into significant and globally competitive businesses.

Clusters can be defined as geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions. Successful clusters have a range of different factors in place, and the ten factors we view as critical are shown below. These factors exist to varying degrees in the areas we visited in the UK. We do not believe, however, that there is any single formula or sequence for building successful clusters, and we do not think it is realistic for every region in the UK to develop a biotechnology cluster. Rather we see a cluster approach as building on strengths and removing barriers to development. To get the factors right for cluster development requires actions and co-ordination between government departments, devolved administrations, regional economic development agencies, universities, companies and others. We offer a number of specific recommendations and issues for further consideration aimed at removing barriers to cluster development. Although these arise from our work on biotechnology clusters we think that many of the same issues arise in other sectors in the knowledge driven economy, and the recommendations would therefore apply equally there.

<sup>1</sup> See Appendix 1 for Terms of Reference

<sup>2</sup> A comprehensive analysis of what needs to be done to ensure the UK maintains its European lead in biotechnology is provided in the forthcoming *Genome Valley* report

<sup>3</sup> Described in Chapter 2

## **Critical factors for cluster development**

- i) Strong science base**
- ii) Entrepreneurial culture**
- iii) Growing company base**
- iv) Ability to attract key staff**
- v) Availability of finance**
- vi) Premises and infrastructure**
- vii) Business support services and large companies in related industries**
- viii) Skilled workforce**
- ix) Effective networks**
- x) Supportive policy environment**

### **i Strong Science base**

Leading edge science (including basic, applied and clinical research), academic entrepreneurs and a critical mass of research activity provides the lifeblood of biotechnology clusters. The UK has a world class research base and is particularly strong in many areas of bioscience. In our view, however, a number of barriers and disincentives remain to the effective exploitation of the UK science base. One such barrier can be determining ownership of intellectual property (IP) from research funded by bodies with differing IP policies.

**We recommend that Research Councils, Medical Charities and others work with the Office of Science and Technology to review their respective policies on Intellectual Property (IP) ownership to ensure clarity and avoid conflicting claims, for example by ensuring that IP ownership is vested in the organisation generating the IP (paragraphs 5.2 to 5.5).**

### **ii Entrepreneurial culture**

We applaud the improvements made by universities and research institutes in recent years to improve commercial awareness and entrepreneurship among researchers. We found, however, that young researchers often lack opportunities to build the skills needed for commercialising research. We also see a role for further business competitions to foster entrepreneurship amongst young researchers,<sup>4</sup> and commend the \$50k scheme run by MIT (see Chapter 5) as a model.

<sup>4</sup> In addition, or as an extension to, the Young Entrepreneurs Scheme and Bioscience Business Plan run by the BBSRC

**We recommend that universities seek, in collaboration with the new Science Enterprise Centres, to make more knowledge about management and entrepreneurship available to their science undergraduates and graduates (paragraphs 5.7).**

**We recommend that universities, in conjunction with venture capitalists and other sponsors, introduce student business competitions similar to the MIT \$50k prize to stimulate entrepreneurship and the number and quality of university start-ups (paragraphs 4.10 and 5.7).**

### **iii Growing company base**

Clusters need thriving start ups as well as more mature companies that can act as role models. A key challenge is how to capitalise on the UK's European lead in biotechnology start ups and support these companies as they develop. A crucial issue for companies in biotechnology and other research driven sectors is how to sustain their R&D activities over the relatively long periods before products reach market. We consider that existing mechanisms do not adequately meet needs and were greatly impressed during our visits to the US by the role played by the Small Business Innovation Research (SBIR) programme in supporting the early development of research driven companies.

**The DTI will consider, in consultation with other Government Departments and devolved administrations, the lessons which can be learnt from the US about ways to stimulate R&D in SMEs (paragraphs 5.8 and 5.9).**

### **iv Ability to attract key staff**

Biotechnology companies must be able to attract the best management and scientific staff from overseas and larger companies. Clusters can help attract staff by providing an intellectual and business 'buzz' and offering a range of employment opportunities for partners and career development. The quality of life, areas of natural beauty and vibrant international cities also play a role in individual decisions about where to locate. Share options are also important for attracting the best staff, and we found that UK biotechnology companies wanting to attract UK managers, who had gone to the US, back to the UK were not able to match the share options the managers were getting there.

**We welcome the decision by the Chancellor to provide incentives to enable companies to attract and retain the best staff, and from next year small, growing companies will be able to offer key staff tax-advantaged options over shares up to £100,000. (paragraphs 5.10 and 5.11).**

## **v Availability of finance**

Biotechnology companies are often dependent on the financial community to support them for long periods of time. Companies and investors value being located close to each other in clusters. A problem at the national level is a growing shortfall in the amount of equity finance available for biotechnology companies. We are impressed by the increase in equity finance that has been achieved in Germany through enhanced incentives. Substantial amounts of equity finance will need to flow into biotechnology companies in the UK over the next decade if we are to maintain our lead in Europe and we believe that improving incentives for private investment is the most effective way to increase equity finance in the UK for high technology companies.

**We welcome the recent changes to Capital Gains Tax to provide taper relief which introduces lower effective rates<sup>5</sup> which we believe will help to increase equity finance in the UK (paragraph 5.12).**

## **vi Premises and infrastructure**

Biotechnology companies require specialist premises with leasing arrangements which are flexible enough to meet their changing needs. We found that laboratory space is often not available in locations where they are needed, or do not provide the terms and conditions which adequately meet company needs. We encourage the private sector, university landlords and others to consider ways to provide short term leasing arrangements for biotechnology companies, and for biotechnology companies to communicate better their current and future accommodation needs. We also consider government can play an important role through the planning system.

**We recommend that the Regional Development Agencies give consideration to the need to promote ‘Urban Networks for Innovative Cluster Areas’ (UNICAs) in their regional strategies, and that the DETR issue guidance to Regional Planning Bodies and local authorities on how to take account of this concept through the planning system (paragraphs 5.13 to 5.18).**

<sup>5</sup> 10% for longterm holdings of shares qualifying as business assets.

## **vii Business support services and large companies**

Proximity to specialist business services, such as patent agents, lawyers, recruitment and property advisors form an important benefit for companies in clusters. Proximity to large companies in industries relating to biotechnology (e.g. pharmaceutical, agrifood and chemical) is an important driver to cluster development in a number of ways, such as providing management expertise, partnering opportunities and customers to biotechnology companies.

## **viii Skilled workforce**

In most areas we found that biotechnology companies were generally able to recruit scientists and technicians to meet their needs. We were also impressed by a number of innovative training programmes designed to meet specific needs of local biotechnology companies that have been set up in some parts of the country (paragraph 3.31)

## **ix Effective networks**

We found a number of regional biotechnology associations that provided opportunities for companies, researchers, and others to meet and exchange views and information, as well as undertaking a range of activities to promote biotechnology in the area. Whilst these biotechnology associations in the UK are in their infancy, we found much to commend in the support they provided to companies and in the growth of clusters. We consider that the limited amount of public money that has been secured for the associations has been successfully used and, at least for the short term, we support the case for continuing support.

**We recommend that the DTI and the RDAs find ways to provide continuing financial support for the regional biotechnology associations linking together biotechnology clusters, and to establish new ones in areas with emerging clusters (paragraphs 5.19 and 5.20).**

## **x Supportive policy environment**

Public policy cannot create clusters, they must be business driven. Central, regional and local government do, however, create the conditions which encourage their formation and growth. Central Government is responsible for setting the macro-economic conditions which support innovation and in ensuring that regulations are necessary and proportionate. In Scotland, Wales, and Northern Ireland some of these functions are devolved to the new administrations. We believe that Government can play a new role in collecting

and analysing comparative data in order to map clusters across sectors in the UK. This would provide a tool for government to understand better the dynamics of cluster development.

**To better understand the dynamics of clusters, the DTI will consider developing the UK Competitiveness Index to stimulate data capture for individual clusters and conduct a mapping exercise of cluster activity across sectors in the UK (paragraph 5.21).**

We found that regional economic development agencies can play a leading role in catalysing partnerships to support cluster development and improving the environment for cluster growth. The English Regional Development Agencies create a new opportunity for clusters to be supported at a regional level and for DTI policies to be implemented in a way which 'goes with the grain' of cluster development. The economic development agencies of the devolved administrations can play a similar role to animate cluster development at the regional level. We commend in particular the innovative approach that Scottish Enterprise has taken in developing a clusters approach.

**We invite Regional Development Agencies, and the equivalent agencies of the devolved administrations, in those areas with existing or strong potential for biotechnology clusters, to look at improving the environment for cluster growth, for example by addressing skills, planning, supply chain and inward investment issues (paragraph 5.22).**