

Strength and Opportunity

The landscape of the medical technology, medical biotechnology and industrial biotechnology enterprises in the UK



This is the first of an annual report which analyses the information contained in the Bioscience & Health Technology Database. Further documents will be issued in the autumn of 2010 and 2011.

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Foreword

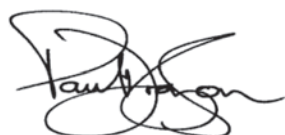
The life sciences industry is of vital importance to the UK and is one of a number of high-tech industries that will play a leading role in building a stronger UK. A flourishing UK life sciences industry will drive economic growth and play a key role in meeting future healthcare challenges.

An ongoing understanding of the size and shape of the industry is crucial if we are to create an environment in the UK where life sciences companies can continue to flourish. We therefore welcome the collaborative work between the regional and national support networks, the Department for Business, Innovation and Skills (BIS), the Department of Health (DH) and UK Trade and Investment (UKTI) that has led to the creation of a database of companies active in the Medical Technology, Medical Biotechnology and Industrial Biotechnology sectors across the UK.

The first of its kind, this comprehensive initiative by Government and industry will make a vital contribution to the Government's work on life sciences and will be invaluable in improving our understanding of these sectors. It will feed into many priority areas of work including delivery of the "Life Sciences Blueprint", the "Government Response to Review and Refresh of Bioscience 2015 Report", the "Government Response to the Industrial Biotechnology Innovation & Growth Team Report to Government" and the ongoing work of the Ministerial Medical Technology Strategy Group. The database will also support UKTI's work to promote the UK life science industry to overseas procurers, investors and influencers as part of the UK Life Sciences Marketing Strategy.

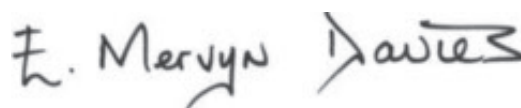
This report, the first of an annual series, analyses the information contained in the database to present a picture of the real strength in these sectors across the UK. Over 3,500 companies have been identified, spread across the regions and Devolved Administrations, employing approximately 78,000 people and generating a turnover of approximately £15bn.

We would like to acknowledge the valuable contribution made by all those who gave their time and expertise, in particular the Trade Associations, Devolved Administrations, Regional Development Agencies, Medilinks and networks.



Lord Drayson

Minister for Science and Innovation
DEPARTMENT FOR BUSINESS,
INNOVATION AND SKILLS



Lord Davies

Minister for Trade, Investment and
Small Business
UK TRADE AND INVESTMENT



Mike O'Brien MP

Minister of State for Health Services
DEPARTMENT OF HEALTH

Executive Summary

The Bioscience & Health Technology Database covers three sectors of the UK life science industry that collectively employ 78,000 people and have a combined turnover of £15bn. The medical technology, medical biotechnology and industrial biotechnology sectors contain nearly 3,600 companies in the UK many of which are developing innovative technologies, product and processes in areas as diverse as magnetic resonance imaging, anti-cancer drugs and biopolymers.

The medical technology and biotechnology sectors are both engaged in servicing the global healthcare market and their products are used by the NHS daily to treat and care for patients. Industrial biotechnology has developed from the same technology platform underpinning the medical biotechnology sector, and together they continue to benefit from the internationally strong UK research base in life sciences.

The database contains information for all the medical technology and biotechnology activity for the three sectors. The data excludes information on the pharmaceutical sector as this information is already identifiable under the Standard Industrial Classification (SIC) codes used by the Office for National Statistics (ONS).

Medical Technology Sector

The medical technology sector in the UK consists of 2,771 companies generating £10.6bn of turnover in a complex market covering products from consumables such as disposable surgical gloves to systems that enable surgeons to see inside the body as they carry out minimally invasive surgery. The sector employs 52,000 people in primarily small and medium size enterprises, which make up 98% of all companies. The UK is home to 340 companies with turnover greater than £5m. 43% of the companies in the sector are less than ten years old and 67 new companies have been formed in the last two years.

Four segments; wound care management, in-vitro diagnostics, orthopaedic devices and single use technology are the largest segments by turnover, each with just over £1bn in sales and together they make up 40% of the total UK turnover. The professional services, in-vitro diagnostics, single use diagnostics, wound care and orthopaedic devices segments contain 41% of all employees in the sector. The sector is supported by a strong network of specialist suppliers (segmented as professional services), which is the segment with the largest number of companies and employees.

Activity in the medical technology sector is present in every region of the UK with certain regions having high levels of activity in certain segments. The South East, the East of England, Yorkshire and the Humber, the North West and Scotland, make up nearly 70% of all turnover, and approximately 50% of employment and companies. This analysis represents the picture in 2008 and does not capture any regional growth rates.

Medical Biotechnology Sector

The medical biotechnology sector in the UK consists of 777 companies with a combined turnover of £4.2bn representing an estimated 30% of European turnover in the sector¹ and employs over 24,000 people. 90% of the companies in the sector have fewer than 50 employees. Medical biotechnology is driven by innovation with 86% of all companies engaged in research and development. The UK has one of most developed medical biotechnology sectors in Europe with a balance of young and established businesses. These are supported by a network of specialist suppliers employing 56% of the sector workforce. The sector has developed a manufacturing infrastructure with 26% of companies investing in this capability.

Of companies developing new therapies, the largest segments in terms of turnover and employment are small molecules, antibodies and therapeutic proteins, which together account for 53% of turnover and 44% of employment. The split of companies is almost equal between those developing small molecules based products and products containing large molecules such as proteins or DNA.

While all regions have some activity in the sector overall, it is concentrated in the South East, the East of England, Scotland and the North West. If the London region is also included, then 87% of turnover, 73% of employment and 74% of companies are accounted for in these five regions.

The health of the medical biotechnology sector can be measured by the pipeline of products in development, particular those products that are in human trials. Using a third party database² companies in the sector were found to have 245 therapies in development with small molecules making up the majority, and new technology products such as therapeutic proteins present in all phases of development.

Industrial Biotechnology

The industrial biotechnology sector contains a total of 64 companies with a combined turnover of £230m; employing 1,600 people across the UK. 98% of these companies are SMEs with only one company employing more than 250 employees. The companies represent the core technology and process developers which are suppliers to often large chemical or pharmaceutical companies that use the technology to produce final products. 66% of companies are engaged in research and development. The top three segments are pharmaceutical intermediates, biofuels and fine & speciality chemicals which make up 77% of turnover and 71% of employment in the sector.

The North East, Wales, Yorkshire and the Humber and Scotland contain 61% of all industrial biotechnology companies. As the sector emerges as a standalone grouping, the patterns of economic activity across the UK may evolve and change.

1 IMS Health, MIDAS, MAT Dec 2007

2 BioPharm Insight

Introduction

The UK is a global leader in life sciences. The UK medical biotechnology sector leads Europe in the number of drugs in all stages of clinical development and is second only to the US globally in the number of bio-therapies in clinical trials³. The UK life sciences industry is also one of the high-tech industries that will play a leading role in building a stronger Britain of the future⁴.

The need for better industry data to allow policy makers to fully understand the scope of the medical technology, medical biotechnology and industrial biotechnology sectors has been raised by various high-level government and industry initiatives. Previous analysis of the data available for these sectors highlighted the need for a customised data set, particularly as the Standard Industrial Classification (SIC) codes used by the Office for National Statistics (ONS) do not allow medical technology, medical biotechnology and industrial biotechnology companies to be separately identified. SIC codes do allow the pharmaceutical sector as a whole to be identified. Whilst there will be some overlap between the pharmaceutical sector and the medical biotechnology sector, the majority of turnover and employment attributed to the pharmaceutical sector in ONS statistics is from UK activities of large, multinational pharmaceutical companies.

The database and this analysis include SMEs that are active in both small molecules and large molecules (often referred to as biopharmaceuticals). This approach has been adopted to give as comprehensive a picture as possible of the economic growth associated with the application of biotechnology to drug discovery and development.

The Department for Business, Innovation and Skills (BIS), the Department of Health (DH) and UK Trade and Investment (UKTI) collaborated with the relevant Trade Associations, Devolved Administrations, Regional Development Agencies and networks that support these sectors to develop a database of companies that are active in the UK. The information supplied by the support networks was supplemented with data purchased under licence from the Dun & Bradstreet and FAME databases. This led to the creation of the Bioscience and Health Technology Database which is now in use across these three government organisations.

This in-house comprehensive data resource will improve the understanding of these sectors and help provide evidence and analysis to inform future policy making. The data will inform the work of many priority areas including delivery of the Bioscience Innovation and Growth Team (BIGT) 2015 review, the Industrial Biotechnology Innovation and Growth Team (IBIGT) review and the ongoing work of the Ministerial Medical Technology Strategy Group (MMTSG). UKTI will also use this information to promote the UK's life science industries to overseas procurers, investors and influencers as part of the UK Life Sciences Marketing Strategy.

This analysis of the information contained in the database has been supplemented by data from other sources and gives a picture of the structure of these sectors in the UK. The database will be updated annually and a further analysis document produced. This will

3 Beyond Borders: Global biotechnology report 2008, Ernst & Young

4 Life Sciences Blueprint: A statement from the Office for Life Sciences, July 2009

allow the accumulation of trend information across the three sectors. The sector and sub-sector definitions and the methodology used in constructing the database are contained in Appendix III. The database contains information on the medical technology, medical biotechnology and industrial biotechnology sectors. For a complete picture of the life science industry in the UK, the pharmaceutical sector should also be taken into account.

- In 2007, the UK pharmaceutical sector employed around 67,000 people working in 596 enterprises and had a turnover of over £16bn and a GVA per employee of £122K. Total Pharmaceutical exports in 2008 were £18bn with a trade surplus of over £6bn.⁵

Global Sector Market Overviews

The medical technology, medical biotechnology and industrial biotechnology sectors in the UK are linked either by their focus on a common marketplace (healthcare) and/or by their use of common technology (biological systems). From an economic perspective they are important in that each sector typically produces higher value products and services for markets which are, or have the potential to be, global in scale and require innovation for continuing success.

1.1. Medical Technology Market

The medical technology market is estimated to be worth £150-170bn worldwide with growth rates forecast at 10% per annum over the next 5-6 years and the market size will approach £300bn by 2015.⁶ This growth is driven by the ageing of the world's population and the per capita income increases in healthcare expenditure across developed countries.

Overall in Europe medical technology expenditure is 6% of total healthcare expenditure, and is increasing with new innovations expanding the capability of the technology.⁷ The USA is the largest market worth just over £70bn and has a strong supply base with the majority of world's largest medical technology companies originating in the country. Europe is the second largest market worth £57bn with a supplier base of 11,000 companies employing some 435,000 people.⁸

1.2. Medical Biotechnology Market

The explosion of knowledge in areas of human biology including genetics, biochemistry and physiology has enabled innovative companies to discover and develop new small molecule drugs for diseases such as cancer and diabetes. The application of new techniques has allowed major pharmaceutical companies and start-ups to identify new targets for small and large molecule based drugs. The database and this analysis include SMEs that are developing both types of compounds.

Therapies based on small molecules represent the largest proportion of sales in the global pharmaceutical market. However, large molecules are the fastest growing group, currently accounting for 17% of global pharmaceutical sales.⁹

The market associated with large molecules (or medical biotechnology) shows that currently there are approximately 145 products on the market with 11% of all clinical trials involving a large molecule or biotechnology based product.¹⁰

6 The Medical Device Market: United Kingdom, March 31st 2009, Espicom Business Intelligence

7 Eucomed Medical Technology Brief, May 2007

8 <http://www.eucomed.org/~media/7804F449C2154F8E9207E8E57B19DD4B.ashx>

9 IMS Health, MIDAS, MAT Mar 2009

10 Consequences, Opportunities and Challenges of Modern Biotechnology in Europe, April 2007, JRC, European Commission

The global medical biotechnology market is estimated to be worth £45-48bn with growth rates of more than 20% per annum over 2002-07 which is more than double the rate for the pharmaceutical market.¹¹ The USA is the largest single market with 65% of all sales, followed by Europe which represents 30% of the global market.¹¹ The major classes of products are erythropietins, anti-cancers, and anti-diabetic treatments accounting for some 45% of all sales.¹²

In Europe the medical biotechnology sector is a major employer with 96,500 people employed in approximately 2,200 companies. The industry is research intensive, with European companies spending around £6.6bn per annum on research and development.¹³

1.3. Industrial Biotechnology Market

The industrial biotechnology market is relatively new and emerging with the potential to achieve sales of £150-360bn in the chemical sector alone by 2025 from a base, worth an estimated at £35-53bn world-wide.¹⁴ This strong growth potential is driven by the ability to provide alternative production processes for oil or gas based chemicals. The use of biological process to produce ethanol or new polymers for plastics has the potential to contribute to the reduction in the dependence of the world's economies on relatively high carbon consuming processes. Around the world, governments are investing significant resources in underpinning research. The OECD reports twenty-one governments budgeted to invest £280m into biofuels research alone in 2007.¹⁵

A recent OECD report¹⁶ predicted that by 2030 biotechnology will contribute to 2.7% of GDP across OECD countries alone. This is equal to over \$1 trillion GVA, made up of \$259 billion in health, \$381 billion in primary production [plants and animals], and \$422 billion in industry.

11 IMS Health, MIDAS, MAT Dec 2007

12 IMS Health, MIDAS, MAT December 2007

13 Biotechnology in Europe: 2006 Comparative Study, Critical I

14 Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy, A report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009

15 OECD Biotechnology Statistics 2009

16 OECD: The Bioeconomy to 2030: Designing a Policy Agenda

Medical Technology Sector

2.1. Sector definition

The definition used for companies included in the medical technology sector are those whose major business activity involves the development, manufacture, or distribution of medical devices as defined by European Union Medical Devices Directive (93/42/ECC). This definition includes any instruments, apparatus, appliances, materials or other articles, whether used alone or in combination, together with any accessories or software for its proper functioning intended by the manufacturer to be used for human beings in the:

- diagnosis, prevention, monitoring, treatment or alleviation of disease;
- diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap;
- investigation, replacement or modification of the anatomy or of a physiological process; and
- control of conception.

The Directive specifically excludes devices that achieve their principal intended action by pharmacological, chemical, immunological or metabolic means, but includes those which may be assisted in its function by such means.

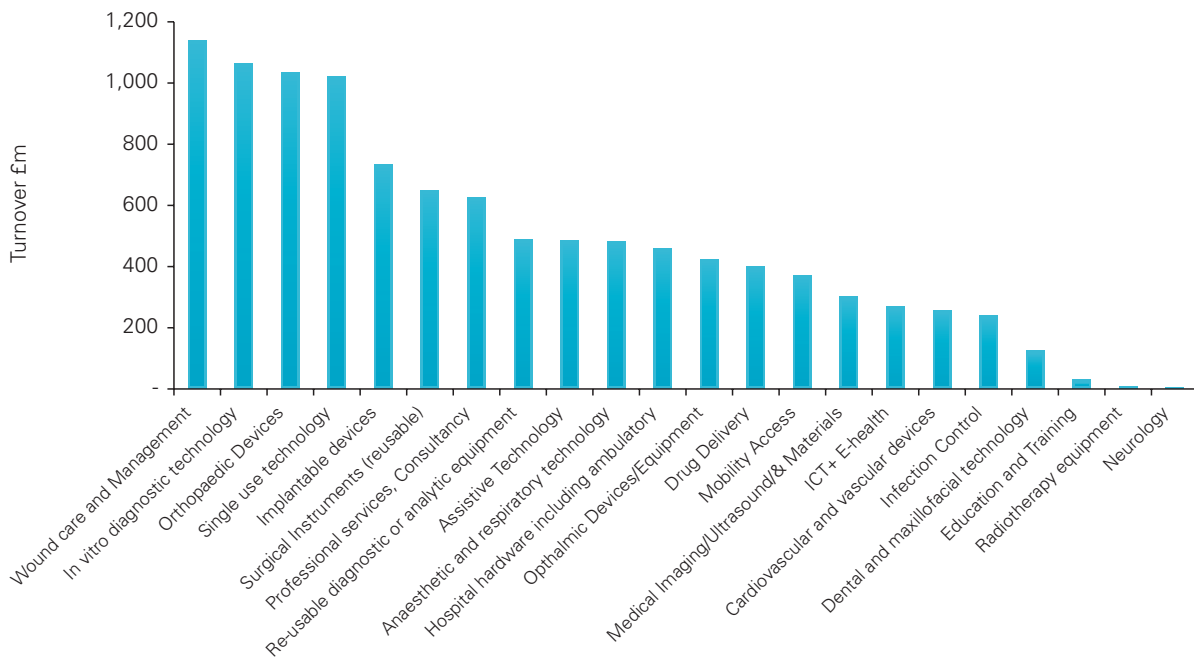
2.2. Sector Overview

The UK medical technology sector contains 2,771 companies with a combined annual turnover based on the latest available company information of £10.6bn. The total employment within the sector is just over 52,000, which represents 13% of all EU medical technology employment, second to Germany with 26%.¹⁷ The companies have been segmented within the database into 21 individual segments (See Appendix III) covering product areas from medical imaging to drug delivery, highlighting the range of technologies and healthcare requirements that are serviced by this diverse sector.

2.3. Turnover, Employment and Segmentation

The total turnover within each segment of the sector is shown in Figure 1. Wound care management, in-vitro diagnostics, orthopaedic devices and single use technology are the largest by turnover, all with just over £1bn in sales. Between them, these four segments make up 40% of the total UK turnover. These four segments along with implantable devices, surgical instruments and sector specialist support services (i.e. consultancy) make up just less than 60% of the entire turnover in the sector.

Figure 1. Turnover by Medical Technology Segment in the UK

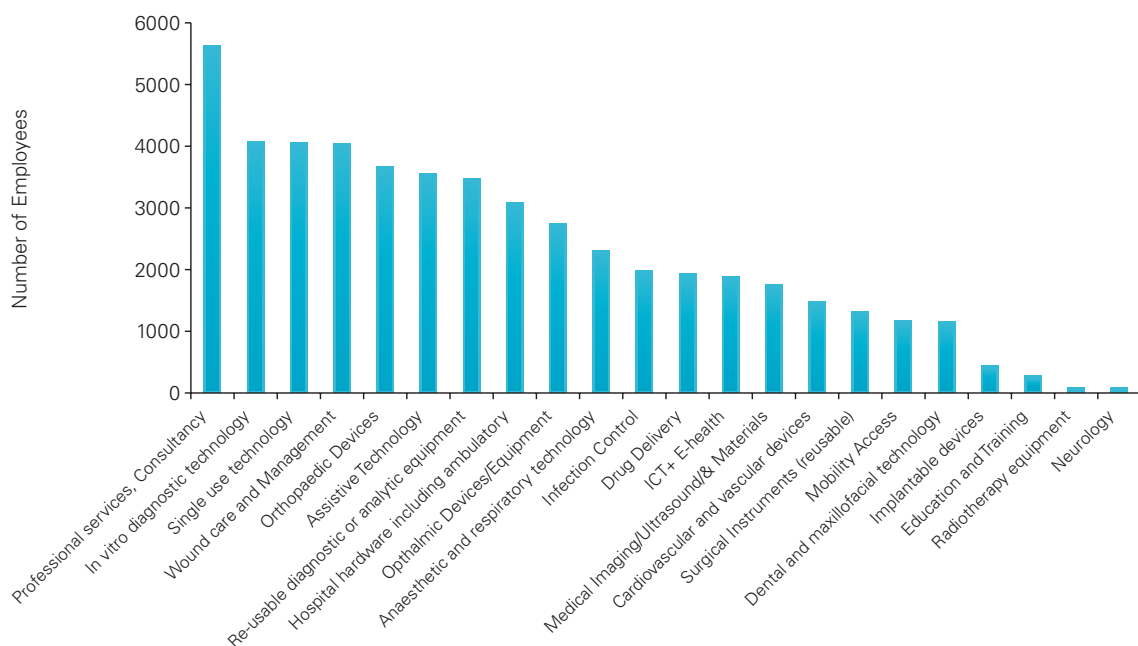


The distribution of employment across the segments gives a different picture and is shown in Figure 2.

Professional services employ the largest proportion with a total of 5,600 employees. These companies provide services such as regulatory and legal advice and servicing or maintenance activities which are important for the overall operation of the sector.

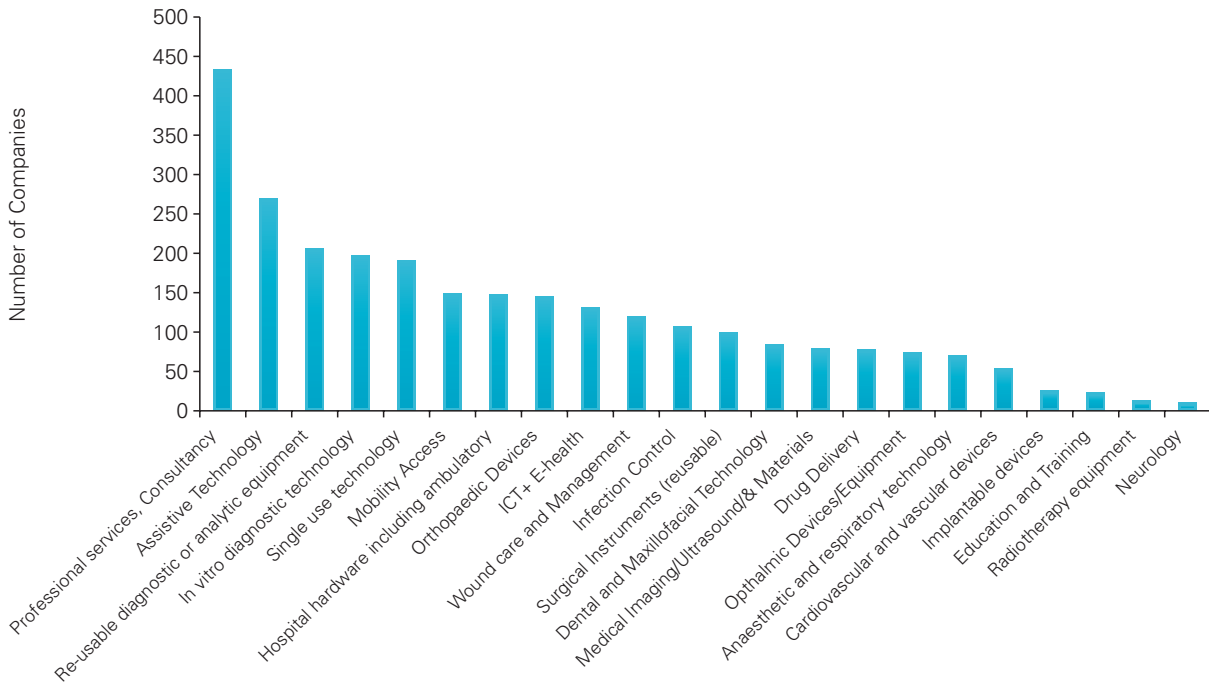
The Top 5 segments for employment contain 41% of all employees in the sector and these are; professional services, in-vitro diagnostics, single use diagnostics, wound care and orthopaedic devices. Just over 60% of all sector employment is contained within the top eight segments.

Figure 2. Number of Employees by Medical Technology Segment in the UK



The distribution of the number of companies between segments gives another perspective of the sector, and is shown in Figure 3. The professional services and consultancy sector contains the most companies followed by those providing products in the assistive technology and re-usable diagnostics equipment segments (e.g. point-of-care monitoring).

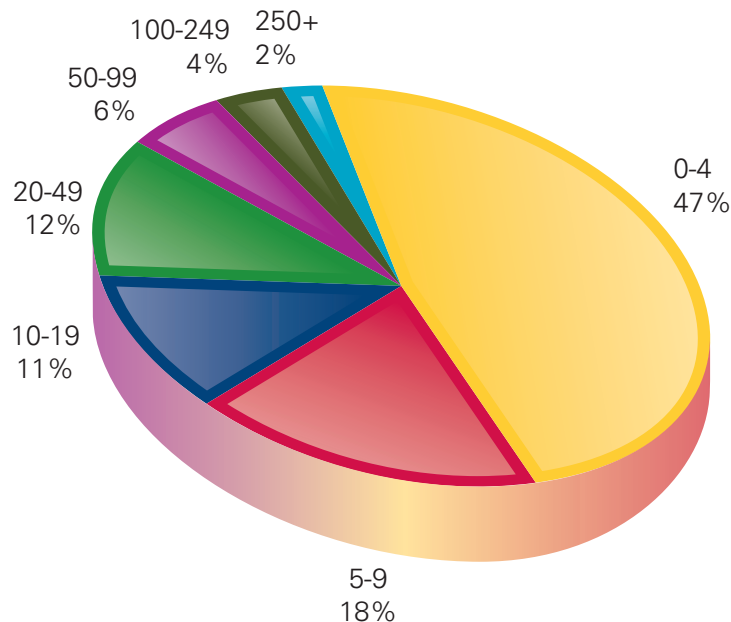
Figure 3. Number of Companies by Medical Technology Segment in the UK



2.4. Company Size and Activity

The majority of companies in the medical technology sector are small and medium size enterprises (SMEs), with less than 250 employees, as illustrated by Figure 4. For the UK as a whole 98% of companies in the sector are SMEs, with 65% of the companies being micro businesses, employing less than ten people.

Figure 4. Distribution of Medical Technology Companies by Employee Bands



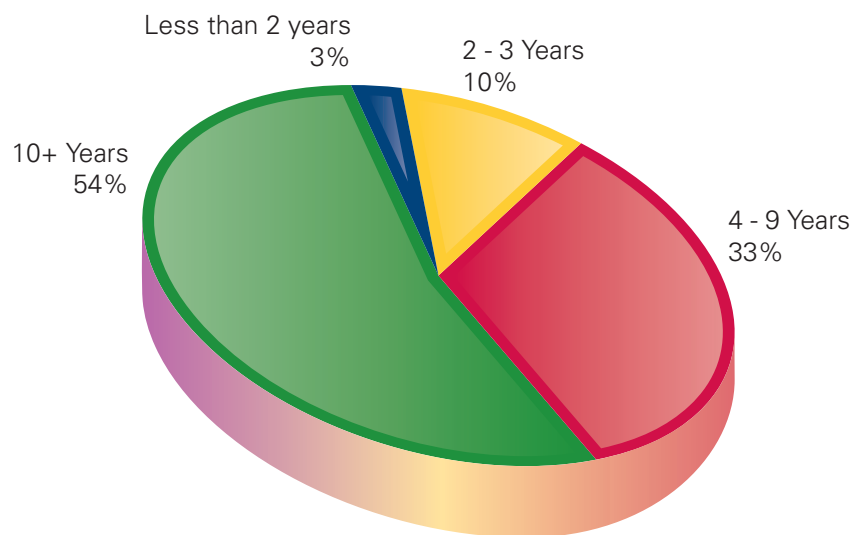
The distribution of total turnover within the sector shows that 90% of medical technology companies have turnovers in the range £100,000-£5,000,000.

The UK is home to 340 companies with sales of over £5m and within Europe has the highest number of public and venture capital backed companies.¹⁸

25% of companies identified, indicated that they are conducting research and development activities, and 43% of companies are manufacturing products. The sites which were classified as manufacturing employ 32,000 people.

The age profile of companies within the database reveals that 43% of all companies are between two and nine years old. Across the individual segments drug delivery, ICT and E-health, and professional services stand out as segments with a high proportion of young companies. Overall the sector has seen the formation of 67 new companies in the last two years with assistive technology, in-vitro diagnostics, orthopaedic devices, single use technology and professional services segments generating 50% of these new companies.

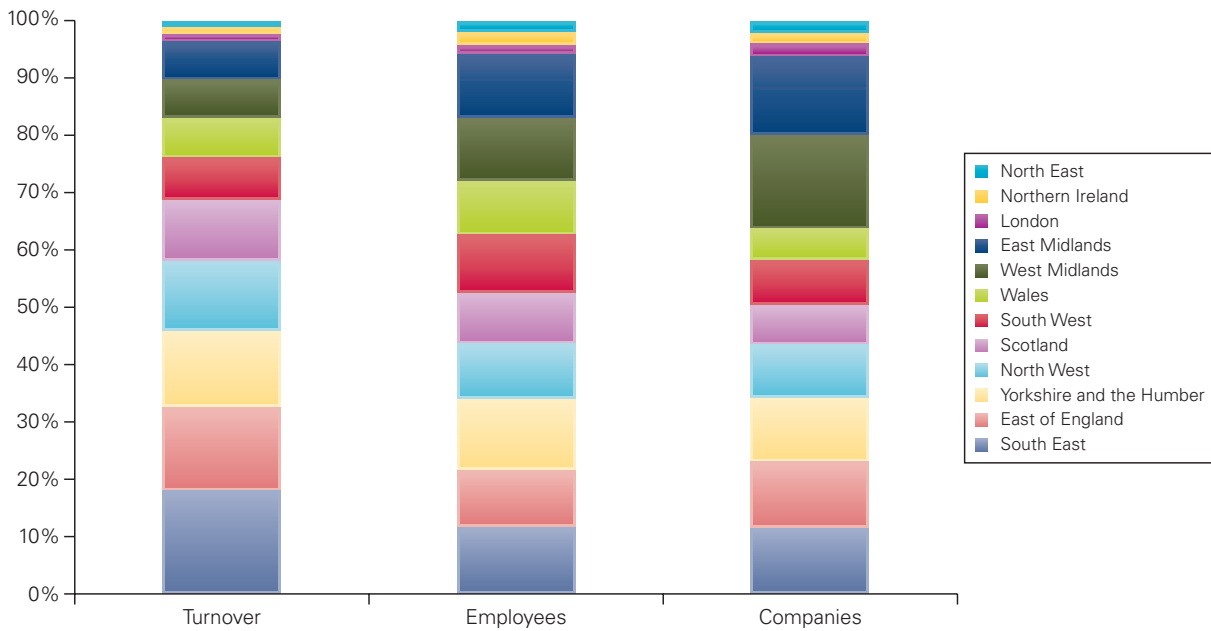
Figure 5. Profile of UK Medical Technology Sector by Company Age



2.5. Regional Analysis

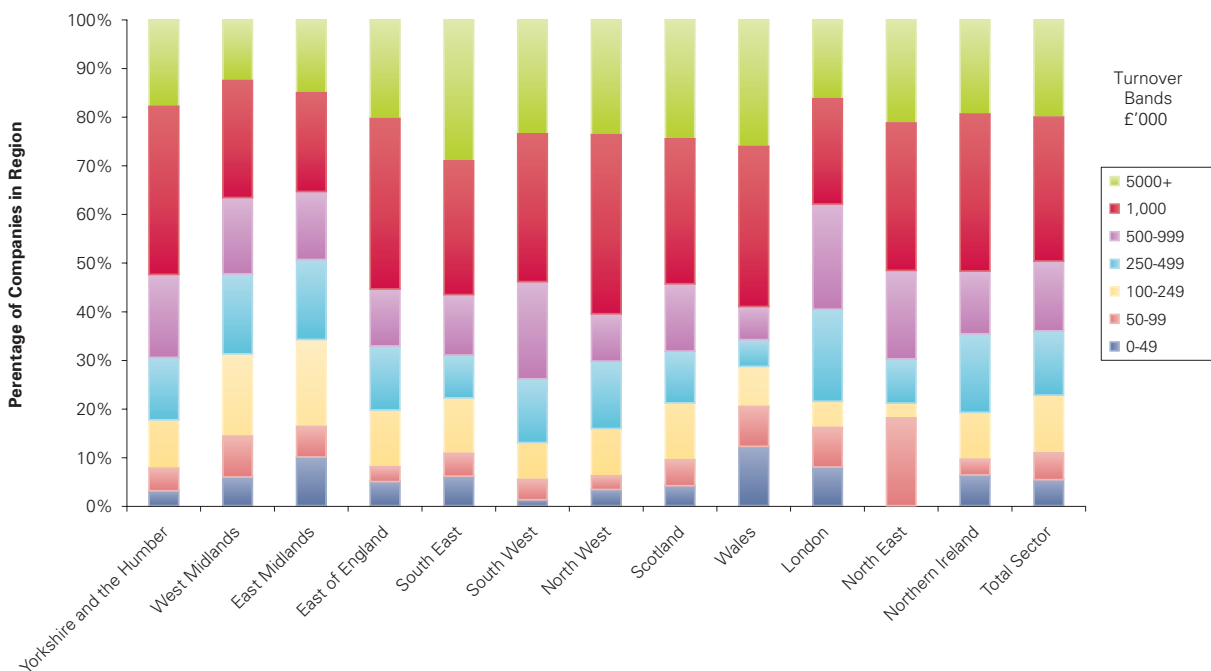
Across the UK, all regions have some activity in the medical technology sector. The distribution in Figure 6 shows the percentage of total turnover, employment and companies within the UK medical technology sector in each region. Some broad patterns are clear with some regions having a share of UK turnover that is higher than their share of employment and companies, for example the South East and East of England.

Figure 6. Regional distribution of Turnover, Employment and Companies for the UK Medical Technology Sector



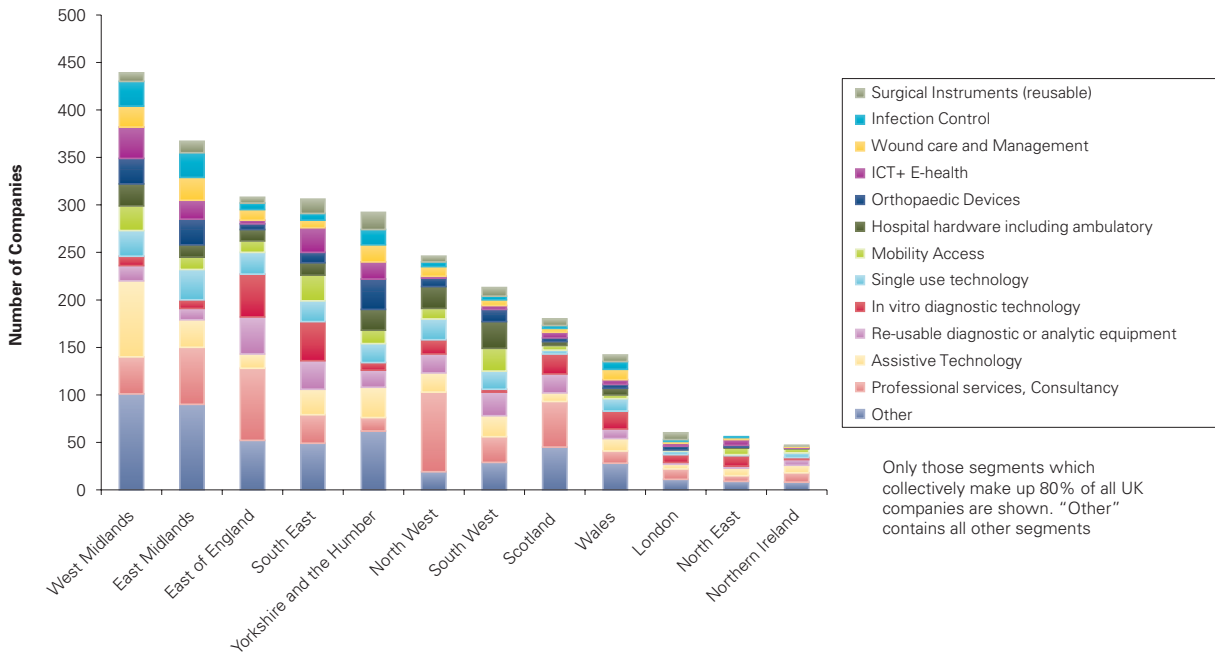
Examining the size distribution of companies by turnover and employment gives further information on the composition of economic activity of the sector within the regions. The distribution of company turnover bands by region is shown in Figure 7. The composition of individual regional clusters will be the result of a number of factors and comparisons will need to be made over time.

Figure 7. Percentage of Medical Technology Companies by Turnover band by UK Region



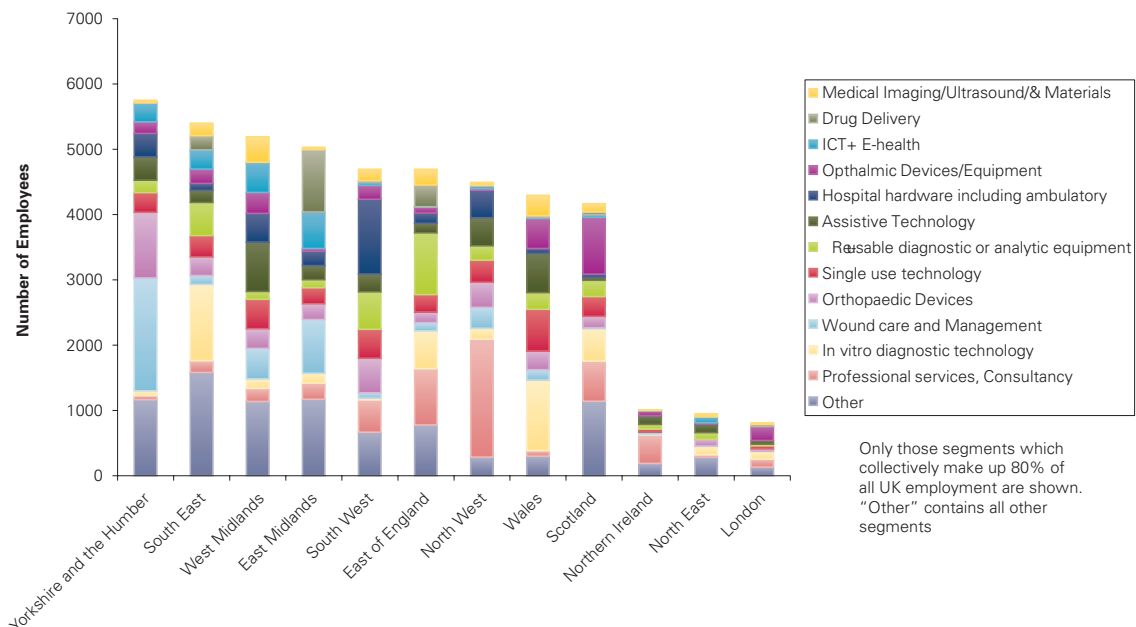
The segmentation methodology adopted for the database allows an in-depth analysis of the regional activity to highlight areas of medical technology and product strengths. In terms of the total number of companies within the medical technology sector, Figure 8 highlights that the West Midlands, followed by the East Midlands and the East of England have the highest number of companies in the sector. Together these three regions account for 42% of all medical technology companies in the UK. The majority of regions have companies in all the major product segments and the location in the UK of all medical technology companies and sites is shown in Appendix II.

Figure 8. Number of Medical Technology Companies per segment by UK region



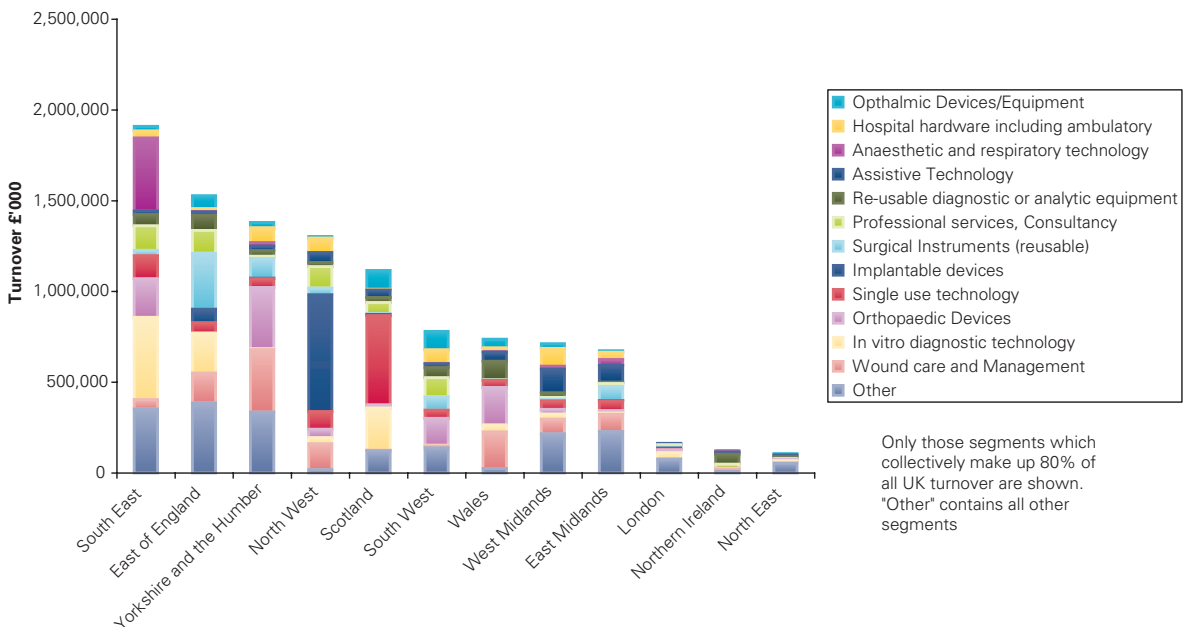
The employment pattern across the UK regions shows Yorkshire and Humber as the largest employer within the sector, with 12% of the UK total.

Figure 9. Total Number of Employees in Medical Technology Companies per Segment by UK Region



Ranking the total turnover by regions shows a different ordering of the regions. Figure 10 shows that the South East and East of England have high turnovers, together representing a third of the UK total.

Figure 10. Total Turnover per Medical Technology Segment by UK Region



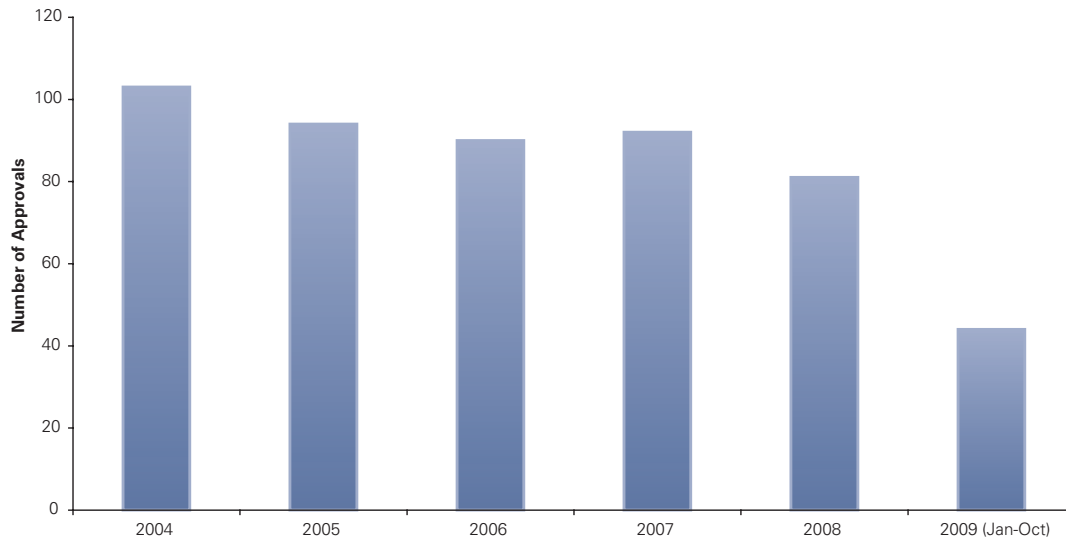
2.6. Medical Technology Pipeline

The medical technology industry is characterised by a high rate of product innovation and short life-cycles for some segments. A measure of the health of the UK industry is to look at the number of devices from UK-headquartered companies that have been approved for marketing in the USA, the world's largest medical technology market, in the previous year and the number of devices that are undergoing the approval process in the USA.

An analysis of data from the BioPharm Insight¹⁹ database is shown in Figure 11. For UK companies, forty-four devices received approval between Jan-Oct 2009. For the years 2004 to 2008 the annual number of products receiving a Premarket Approval or a Premarket Notification 510(k) was 80-100. This number may be conservative as some UK developed devices will be registered for approval through USA subsidiaries. The data does appear to show a slow decline and the numbers up to October 2009 are lower than pro-rata numbers for the first nine months of 2008.

2.7. Sector Investment

Until recent years, the medical technology sector has traditionally not been a sector that has attracted the apparent level of investment in the UK associated with the medical biotechnology sector. This has changed as investors have recognised that the sector has many of the attractive features of medical biotechnology including high growth rates, high technology barriers to entry and has a shorter and less risky product approval process.

Figure 11. Number of Medical Devices for UK companies gaining approval in the USA

Source: BioPharm Insight

Total approvals = Sum of Premarketing approvals and
Premarket notifications 510(k)

The environment for investment in medical technology is more difficult in late 2009 than twelve months ago. Overall across the USA and Europe investment of all types into the medical technology sector decreased by 37% in 2008 compared to 2007. In Europe, a total of £1.7bn of financing was secured in 58 deals with a significant decrease in VC financing (down 19.5%) compared to follow-on, convertible debt and private investment in public equity. This apparent robust performance in Europe is skewed by two large deals that contributed 73% of the total, and if these are excluded then the total European financing in the sector would have been down 44% compared to 2007.²⁰

Despite the environment, the UK fared well in 2008 in terms of attracting VC financing into the medical technology sector, attracting the highest level after France. For all types of financing the UK was the second highest after Germany.²¹ The largest single deal in 2008 involved UK's ApaTech™, a developer of bone graft technologies.²¹

2.8. Trade

The UK market for medical technology and supplies is estimated to be £5bn representing 4.2% of the global market in medical technology.²² Based on the definitions used by Espicom, UK exports have achieved a total growth of 6.6% over the period 2004-2008 to a total of £4.2bn, although a decline of 3.2% was seen in the last year of this period.²³

Data from Espicom has been analysed and mapped to the segmentation used in the

20 Pulse of the industry Medical technology report 2009, Ernst & Young

21 Pulse of the industry Medical technology report 2009, Ernst & Young

22 The Medical Device Market: United Kingdom, March 31st 2009, Espicom Business Intelligence

23 The Medical Device Market: United Kingdom, March 31st 2009, Espicom Business Intelligence

database. The definitions and coverage used by Espicom are not as broad and therefore overall the analysis does not cover all segments, in particular in-vitro diagnostics is under reported. However, the analysis does give a relative picture of those segments that enjoy the highest level of exports. Consistently over the period 2004-2008 the six segments that achieved the highest exports were; orthopaedic devices, surgical instruments, ophthalmic devices, medical imaging, wound care and single use technology.

UK Medical Technology Industry – Profile

- A total of 2,771 companies with a combined turnover of £10.6bn
- Total number of employees 52,000 representing 13% of the EU industry
- 25% of companies investing in R&D
- 43% of companies involved in manufacturing
- 98% of companies have less than 250 employees
- 90% have turnovers in the range £100K to £5m per annum
- The UK is home to 340 companies with turnovers greater than £5m per annum
- 43% of all companies were formed in the last 2-9 years
- 67 new companies were formed in the last two years

Top five segments in the sector

Turnover	Employment	No. of Companies
Wound care	Support Services	Support Services
In-vitro diagnostics	In-vitro diagnostics	Assistive technology
Orthopaedic devices	Single use technology	Re-usable diagnostics
Single use technology	Wound Care	In-vitro diagnostics
Implantable devices	Orthopaedic devices	Single use technology

Medical Biotechnology Sector

3.1. Sector definition

This sector includes companies:

- with an involvement in the discovery, development or manufacturing of biopharmaceuticals;
- offering specialised, sector specific services, to biopharmaceutical companies, and
- SMEs involved in the discovery and development of small molecules drugs.

The activities of large pharmaceutical companies in the development and manufacture of small molecules are excluded from the scope. However, the divisions of large pharmaceutical companies that develop or manufacture medical biotechnology products are included where data on these has been made available.

3.2. Sector Overview

The UK's position as the leading developer of biotechnology derived therapies in Europe and second to the USA in the world for compounds in development is one of the success stories of UK industry over the last 15 years.²⁴ The sector has benefited from the UK's academic excellence, highly skilled work-force, a balanced regulatory regime, fiscal business and intellectual property support policies.

The database identified 777 companies in the sector with a combined annual turnover of £4.2bn, representing an estimated 9% of the global turnover and 30% of the total European turnover.²⁵ The sector employs 24,000 people representing an estimated 25% of the total for Europe.²⁶ The sector is R&D intensive with 57% of all companies in the database carrying out this activity.

3.3. Turnover, Employment and Segmentation

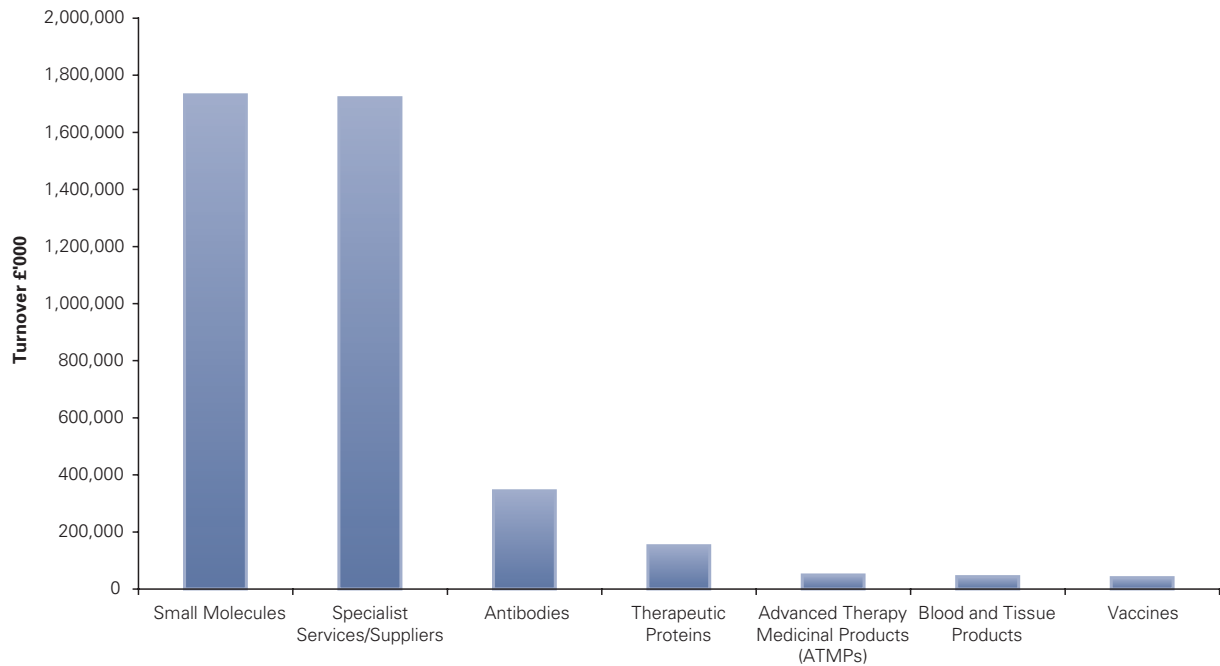
The activities of the companies in the medical biotechnology sector have been divided into seven segments based on the types of final products or services they develop or produce (see Appendix III). The analysis of the total turnover for all companies in each segment, shown in Figure 12, highlights the dominance of small molecule products and specialist services in the sector, each representing 41% of the total sector turnover. The small molecule (traditional chemical drugs) segment contains companies that are SMEs and innovative companies using the latest tools of biotechnology to identify new targets for chemical based therapies.

The biotechnology industry has developed over the last twenty years into a highly networked system of end-product developers and specialist suppliers. A typical biotechnology start-up developing a new therapy will have a large "virtual" component, outsourcing all non-core activities. This industry model is seen in operation in the UK with a high number of suppliers to companies developing new medicines, in fields such as biologics scale-up and production, genomics and proteomics, and clinical trials management.

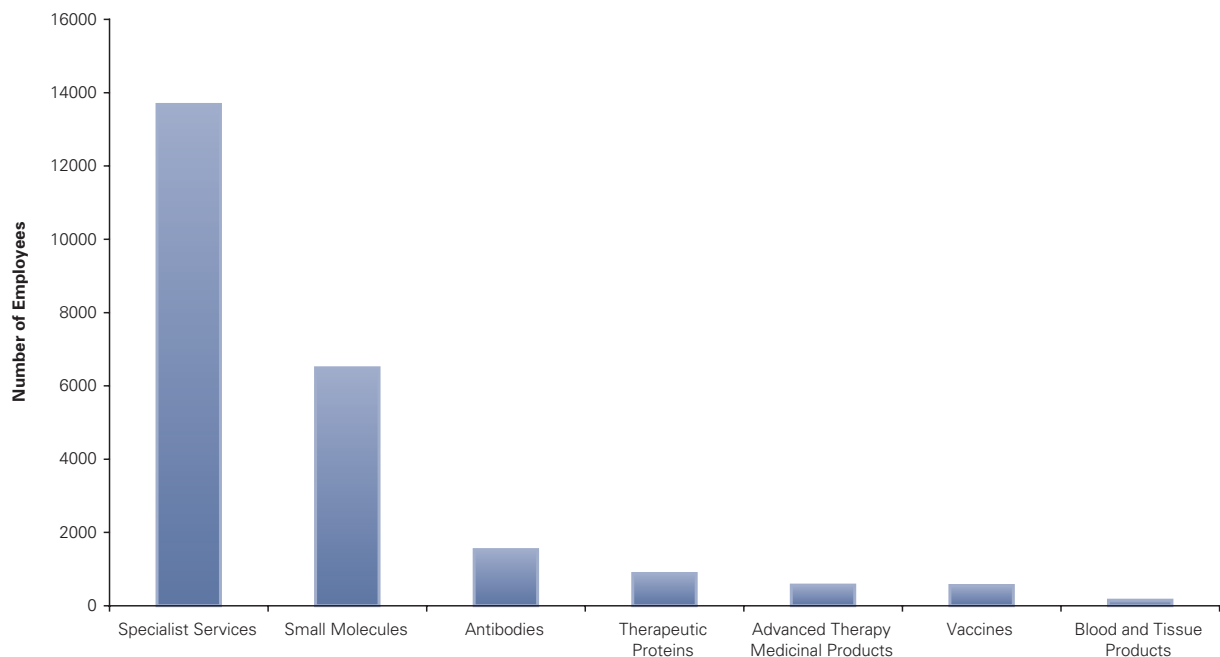
²⁴ Creating a step-change in bioprocessing, bioProcessUK Annual review 2008

²⁵ IMS Health, MIDAS, MAT Dec 2007

²⁶ Biotechnology in Europe: 2006 Comparative Study, Critical I

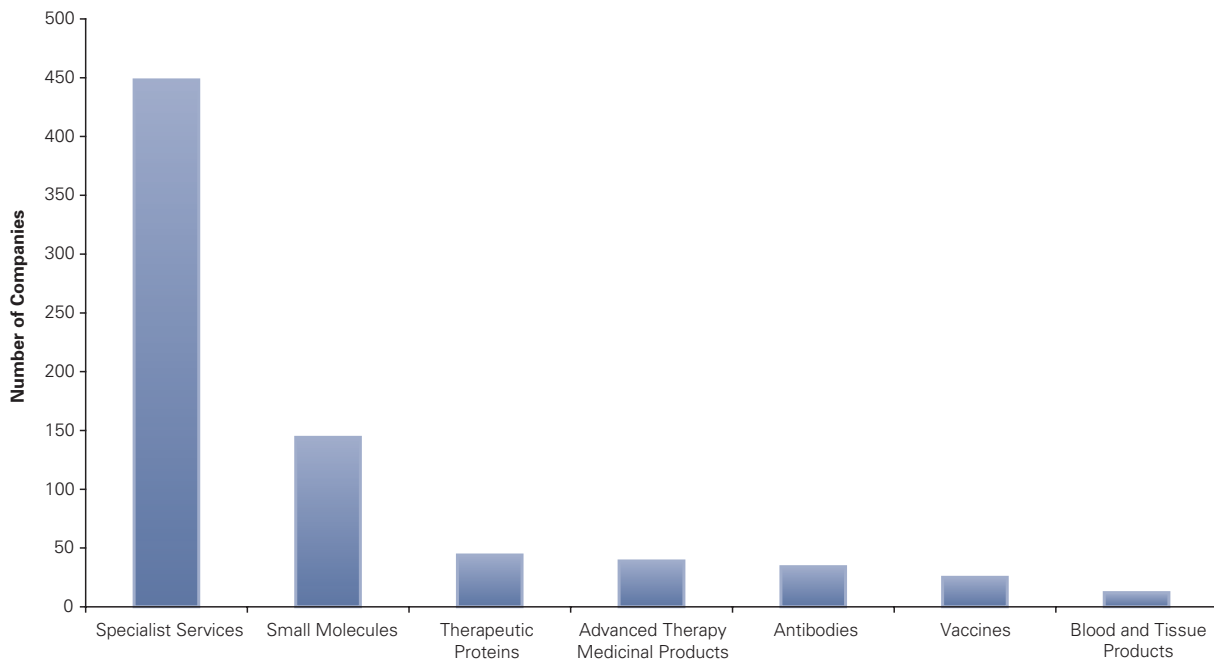
Figure 12. Turnover by Medical Biotechnology Segment in the UK

The employment across the individual segments is shown in Figure 13 which demonstrates the importance of the network of specialist suppliers to the sector with 56% of all employees working to support the core companies. The segments containing companies developing therapies based on the new technologies of antibodies, proteins, peptides, and DNA employ 3,700 people in the UK.

Figure 13. Number of Employees by Medical Biotechnology Segment in the UK

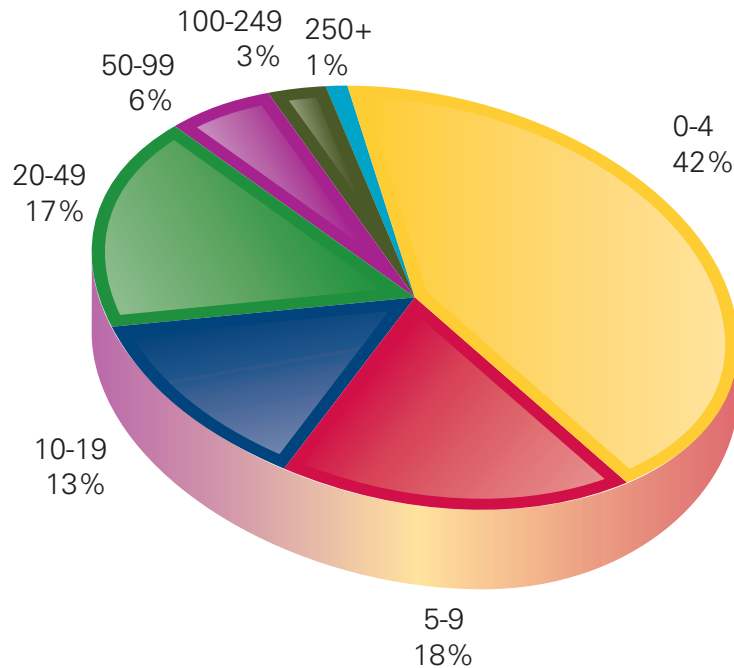
Across the sector, the specialist service suppliers are dominant with just under 450 companies. The remainder of companies are almost equally split between those developing small molecules and large molecules (i.e. antibodies, proteins, or nucleotide fragments) with 144 and 154 companies respectively. In the area of biological based molecular therapies, the UK sector has significant activity in antibodies and therapeutic proteins, which are two of the highest growth classes of products, antibodies representing around \$27 billion sales and protein products generating almost \$52 billion in global sales.²⁷

Figure 14. *Number of Companies by Medical Biotechnology Segment in the UK*



3.4. Company Size and Activity

The UK medical biotechnology sector is dominated by SMEs with 99% of the companies having 249 or fewer employees. This predominance of small companies is a feature of the relatively young industry, but is also driven by the “virtual” company model adopted by most biotechnology companies during the early start-up years.

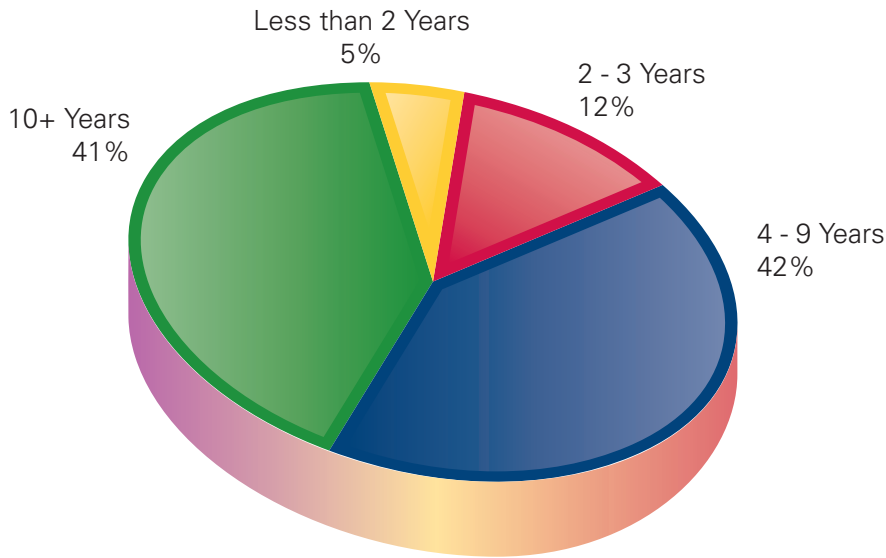
Figure 15. *Distribution of Medical Biotechnology Companies by Employee Bands*

The Critical I report on the sector using data for 2004²⁸ found that the predominant size class in both Europe and USA was companies with twenty or fewer employees. The information from the database shown in Figure 15 is similar with 73% of all UK companies having fewer than twenty employees and 42% having fewer than five employees.

The UK medical biotechnology sector is one of the most developed in Europe with a significant number of large companies and activity. The UK is home to 109 companies with a turnover greater than £5m and seven companies with more than 250 employees. As mentioned previously, 57% of all companies are involved in research and development activities and this rises to 86% for companies developing final products (i.e. excluding the specialist service suppliers). Across the whole sector, 27% of companies are carrying out manufacturing activities.

The age profile of companies is shown in Figure 16 which highlights that medical biotechnology is a young sector with 17% of companies being three years old or less and 5% of companies being less than two years old. At the other end of the scale, further analysis shows that 20% of companies in the sector have been in business for fifteen years or longer. This illustrates that the UK has grown a number of sustainable medical biotechnology companies in this high technology industry.

Figure 16. Profile of UK Medical Biotechnology Sector by Company Age



3.5. Regional Analysis

The distribution of economic activity in the sector is concentrated in four regions. The analysis in Figure 17 shows that the South East, the East of England, Scotland and the North West account for 79% of the entire turnover in the UK sector, and this is reflected in the regional distribution of employees and companies. Including the London region, 87% of turnover, 73% of employment and 74% of companies are accounted for in these five regions.

Examining the composition of the companies in the regions by turnover band, as shown in Figure 18, suggests that the dominance of these regions is not due to a preponderance of larger turnover companies, but the concentration or number of medical biotechnology companies in these regions.

Figure 17. Regional distribution of Turnover, Employment and Companies for the UK Medical Biotechnology Sector

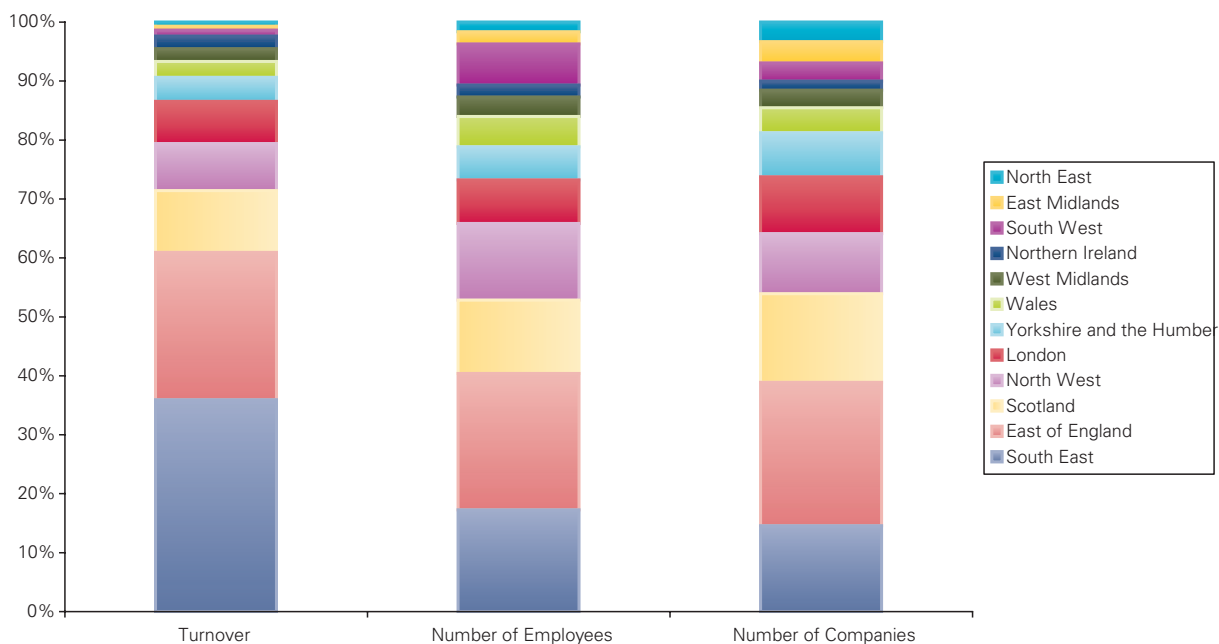


Figure 18. Percentage of Medical Biotechnology Companies by Turnover band for the UK Regions

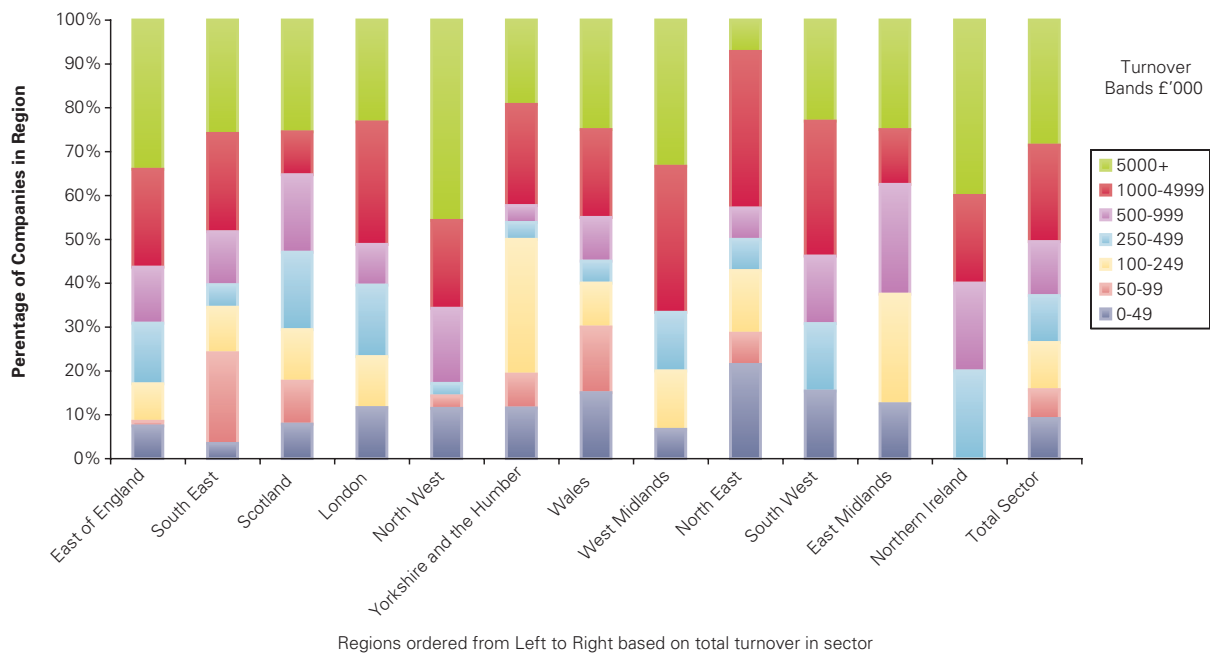
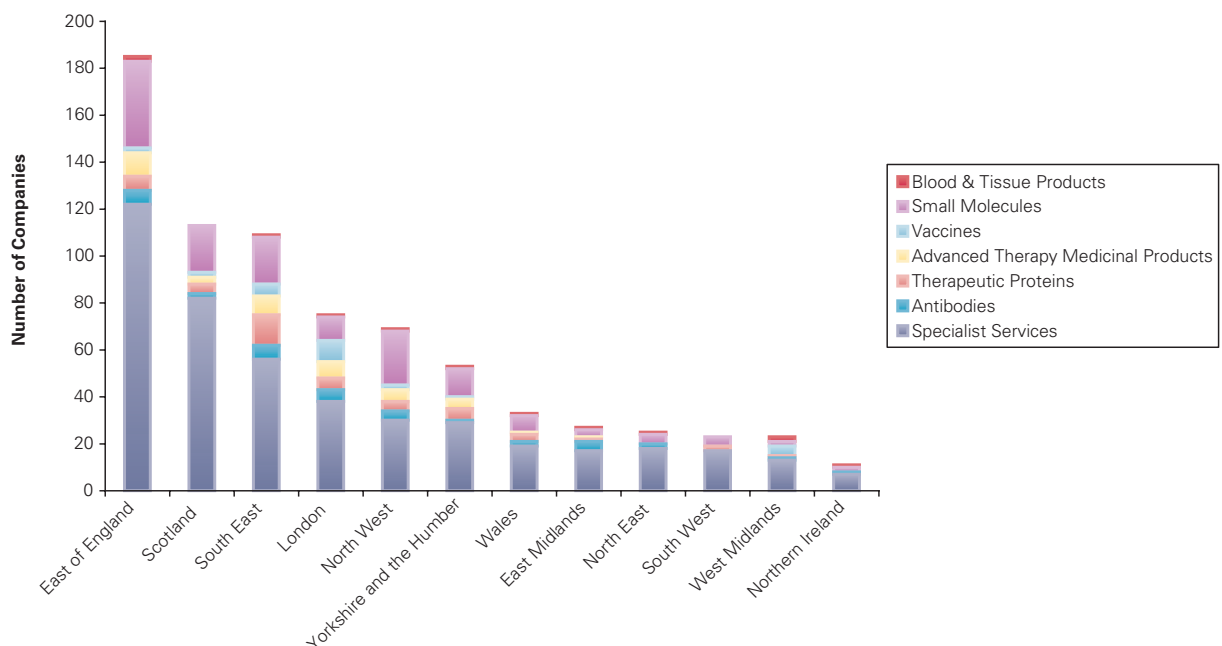


Figure 19 shows the concentration of companies in these five regions and in particular the importance of the East of England as a location of medical biotechnology companies, containing 25% of all companies. Across the UK, the majority of regions have companies involved in all seven segments, and no obvious clustering of companies by final product type can be seen. Interestingly the ratio of specialist suppliers to final product companies appears to be constant for all the regions, averaging 1.67. The location of all medical biotechnology companies and sites across the UK is shown in Appendix II.

Figure 19. Number of Medical Biotechnology Companies per segment by UK region



The pattern of employment shown in Figure 20 also highlights the importance of the five regions previously mentioned, although employment is less concentrated than the number of companies. The distribution of employment across the segments is less uniform than for company activity, with for example Scotland and the South West showing a higher percentage of employees in specialist suppliers than other regions, and the South East, London and Wales having higher percentages of employees in therapeutic proteins companies.

Figure 20. Total Number of Employees in Medical Biotechnology Companies per Segment by UK Region

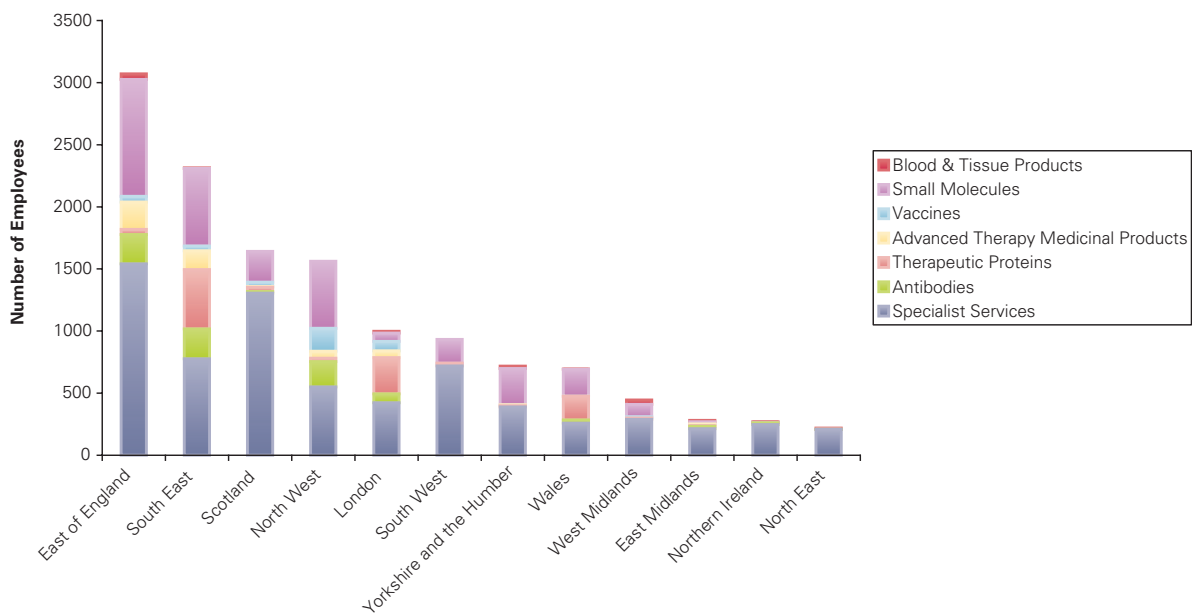
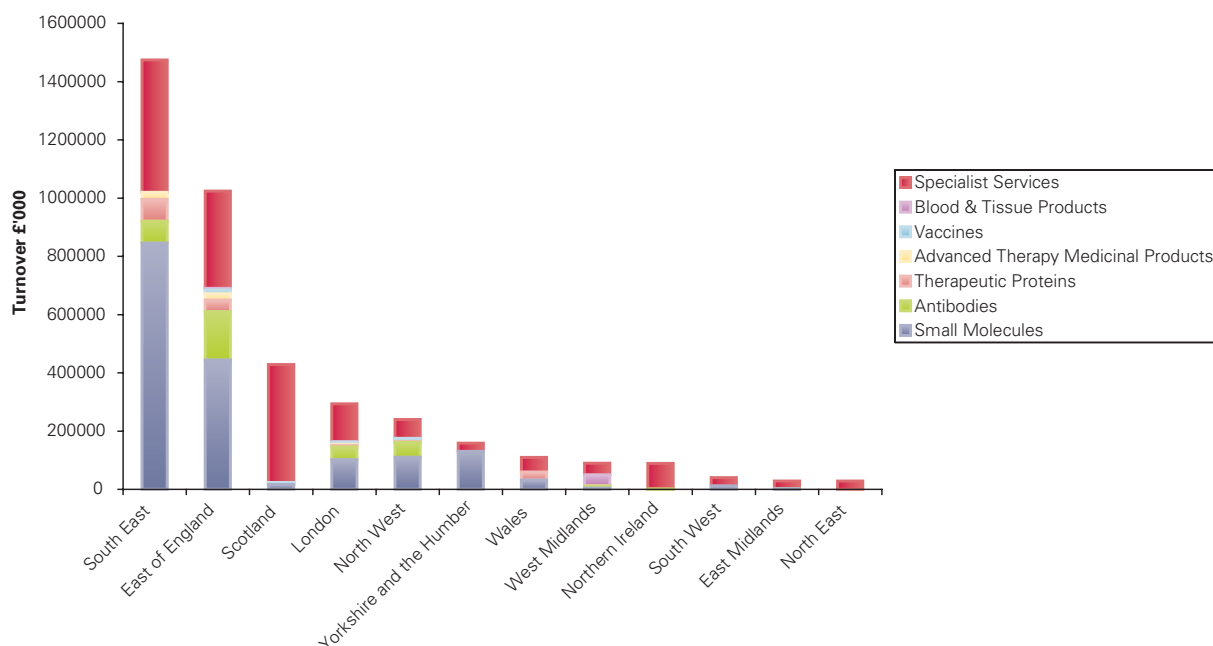


Figure 21 shows the strength of the South and East of England in medical biotechnology, in particular in the small molecule (excluding large pharmaceutical activity in small molecules) and advanced therapies segments. Together these two regions account for 60% of the entire turnover in the medical biotechnology sector, 76% for small molecules and 93% for advanced therapies (e.g. gene and cellular therapies).

Like the pharmaceutical sector, medical biotechnology involves product development cycles of 5-10 years. The industry is still relatively young. Therefore, regions with low turnover or even no turnover, but with relatively high employment and company numbers can still develop fast growing revenues as products receive regulatory approval.

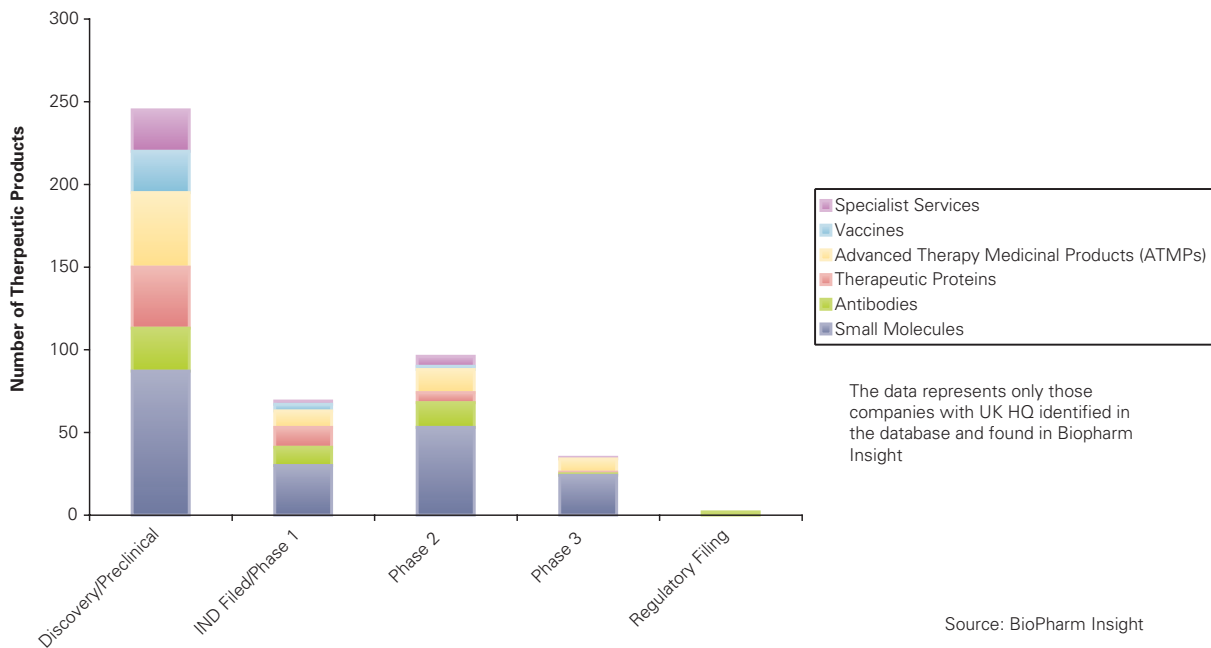
Figure 21. Total Turnover per Medical Biotechnology Segment by UK Region

3.6. Medical Biotechnology Pipeline

The health of the medical biotechnology sector is often measured by the pipeline of products in development, particular those products that are in human trials. The picture for the UK has consistently been strong when measured against the rest of Europe. The 2009 report by Ernst & Young²⁹ showed that the UK had 361 of a total of 1,712 drugs in development across Europe, representing 1 in 5 of all biotechnology drugs.

Using data from BioPharm Insight and cross referencing with companies in the database, a snap-shot of the pipeline gave a different profile as shown in Figure 22. The total number of products in development is 447; the majority of which are small molecules drugs. The total number of antibody, protein, vaccines and advanced therapies (gene therapy, cell therapies etc.) is 253. The proportion of these latter therapies in each phase of development stays relatively constant, showing that UK companies are progressing a range of innovative technologies to market.

Figure 22. *The Pipeline of Medical Biotechnology Products for UK companies*



3.7. Sector Investment

The investment community has historically seen biotechnology as having high potential to generate significant return on investment. In 2007 the total investment for all biotechnology sectors (of which medical is the largest) from all sources in the European sector reached £4.5bn, continuing the year-on-year increases seen since 2002.³⁰ The UK was the largest destination for all types of funds and second to Germany in terms of VC investment.³¹ The life-blood of start-up and growing biotechnology companies is VC investment, and in Europe this has declined over 2004-2007, while follow-on and share offering finance has increased steadily, mirroring the maturing of companies as they progress from start-up to growing.³²

The Venture Source³³ database was used to examine funds raised over the last five years and up to October 2009. Figure 23 shows that activity peaked in 2005 with a significant decline between 2007 and 2008. The high proportion of investment in the small molecules segment reflects the overall number of these companies present in the UK sector.

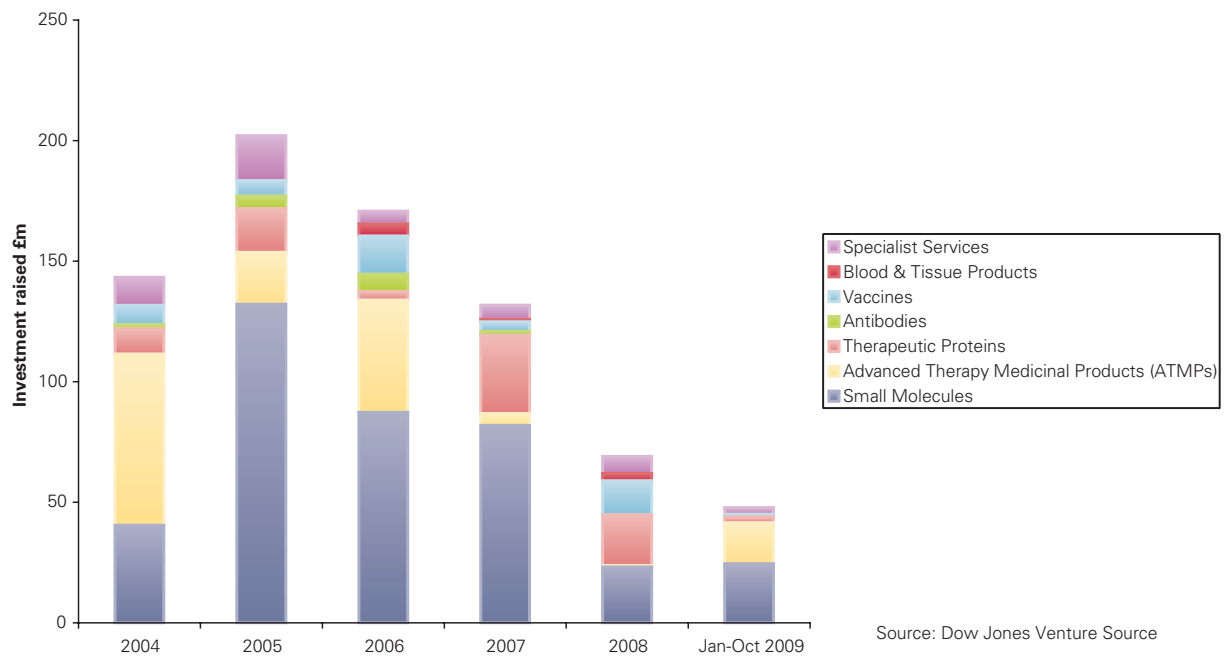
30 Beyond Borders: Global biotechnology report 2009, Ernst & Young

31 Beyond Borders: Global biotechnology report 2009, Ernst & Young

32 Beyond Borders: Global biotechnology report 2009, Ernst & Young

33 Dow Jones Venture Source

Figure 23. Investment raised by UK Medical Biotechnology Companies by Segment over 2004-2009



UK Medical Biotechnology Industry – Profile

- A total of 777 companies with a combined turnover of £4.2bn
- Total number of employees 24,000 representing 25% of the European employment
- 86% of development companies carrying R&D activity
- A pipeline of 447 drugs in development
- Industry of SMEs representing 99% of all companies
- The UK is home to 109 medical biotechnology companies with a turnover greater than £5m
- 25% companies are four years old or less
- 31 companies are less than two years old

Top 3 segments in the sector

Turnover	Employment	No. of Companies
Small Molecules	Specialist Service Suppliers	Specialist Service Suppliers
Specialist Service Suppliers	Small Molecules	Small Molecules
Antibodies	Antibodies	Therapeutic Proteins

Industrial Biotechnology Sector

4.1. Sector Definition

This sector includes enterprises employing the use of biological substances, systems and processes to produce materials, chemicals and energy, but excludes the production of primary pharmaceutical products. Examples of products made by bioprocesses that are not pharmaceutical products include; bio-ethanol fuel, bio-polymers, pharmaceutical intermediates, paper and organic acids. It includes enterprises that support industrial biotechnology manufacturers with contract research or development and sector specific services.

4.2. Sector Overview

The industrial biotechnology sector in the UK, as measured by companies developing technology, is relatively young as a standalone grouping. It is underpinned by the same biotechnology infrastructure which drives the growth of the medical biotechnology sector.

The sector also benefits from a large chemical and processing industry in the UK as a customer for the technology. Although not covered in the scope of the database, chemical companies in the UK already use biotechnology based processes and represent a strong market pull for companies developing the technology.

The UK has 64 companies whose primary business activity is industrial biotechnology covering biofuels through to pharmaceutical intermediates. These companies together generate sales of £230m per annum based on the latest financial data and employ 1,600 people. These figures represent the direct output from the sector. It does not include industrial biotechnology activities carried out in large chemical or energy companies. The application of the technology, particularly by chemical and pharmaceutical companies, will generate more economic activity and outputs.

A previous study from the Industrial Biotechnology Innovation and Growth Team in 2008 identified 42 companies in the sector.³⁴ These companies were identified as “core” developers or providers of technology. In the segmentation used for the Bioscience & Health Technology Database, companies that provide specialist services to the sector, such as developing enzymes or fermentation, are also included.

4.3. Turnover, Employment and Segmentation

The turnover recorded in the database is derived from companies that are developing core products or processes within this emerging sector. It does not include the value of the final products that are produced from the technology.

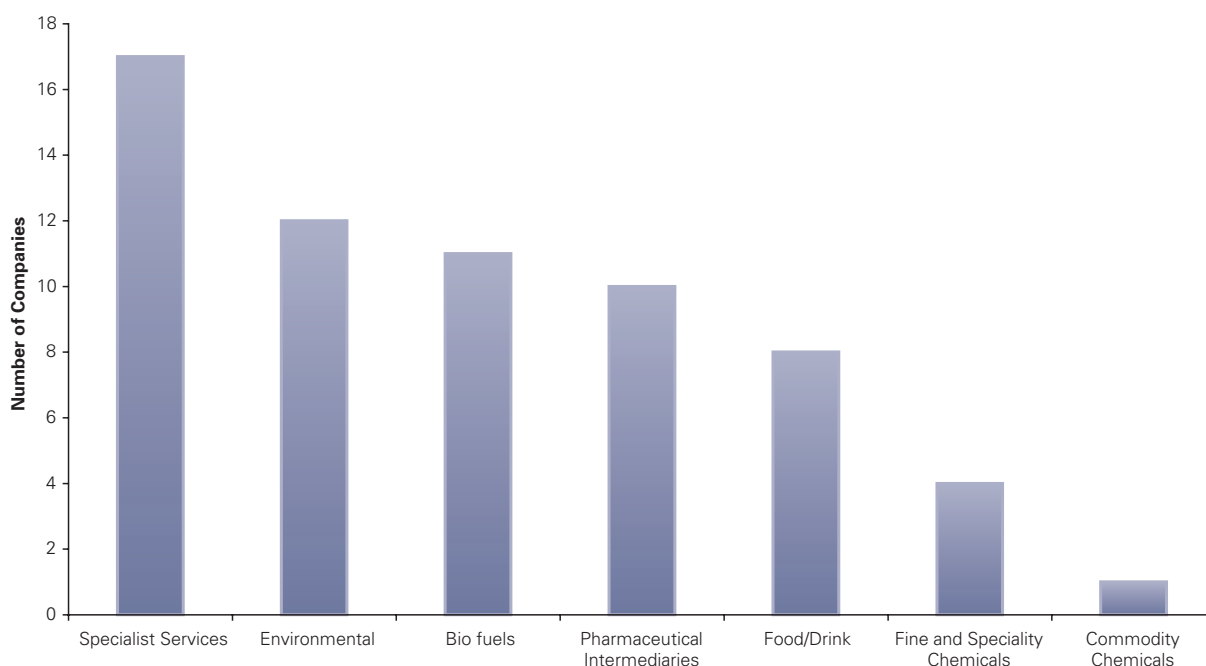
The total turnover of £230m is currently dominated by the fine and speciality chemicals, biofuels and pharmaceutical intermediates which together make up 77% of the entire turnover in sector. The production of chemicals by fermentation or the application of enzymes to make pharmaceutical intermediates has been established for many years and has grown into a significant activity in the UK.

³⁴ Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy, A report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009

The distribution of employment in the industrial biotechnology sector shows the same pattern with the biofuels, fine and speciality chemicals, and pharmaceutical intermediates segments accounting for 71% of all employment in the sector.

The number of companies in each segment is shown in Figure 24 highlighting the number of specialist service companies that have developed within the sector. The overall distribution of companies between segments is similar to that seen in the Industrial Biotechnology Innovation and Growth Team report³⁵ which identified pharmaceutical intermediates, environmental and biofuels as the top three segments in terms of the number companies.

Figure 24. *Number of Companies by Industrial Biotechnology Segment in the UK*



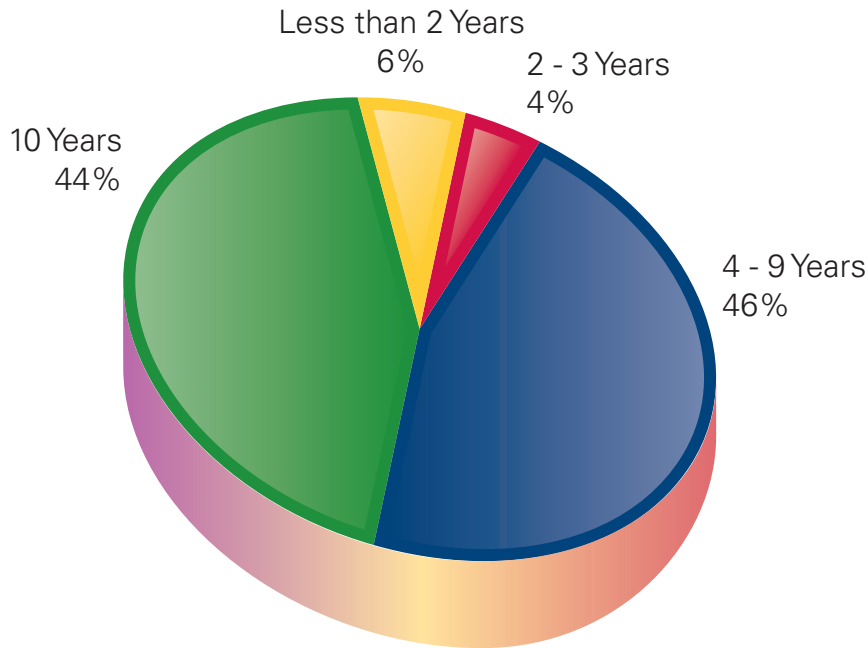
4.4. Company Size and Activity

Of the companies for which data was available, 98% were SMEs with less than 250 employees. Only one company identified within the sector has more than 250 employees and a turnover greater than £5m. Figure 25 shows the age profile of the companies. Ten percent were formed within the last three years, and 44% have been in existence for ten years or more. Industrial biotechnology processes have been applied in industry for many years typically by pharmaceutical companies utilising enzymes to make intermediates or chemical companies making compounds such as succinic acid. As the industry has grown and in particular as the market for low carbon products and processes has become important, the incentives to establish companies in the sector have increased.

Of the 64 companies, 66% are involved in research and development activities. Manufacturing capability and infrastructure is present in 50% of the companies.

35 Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy, A report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009

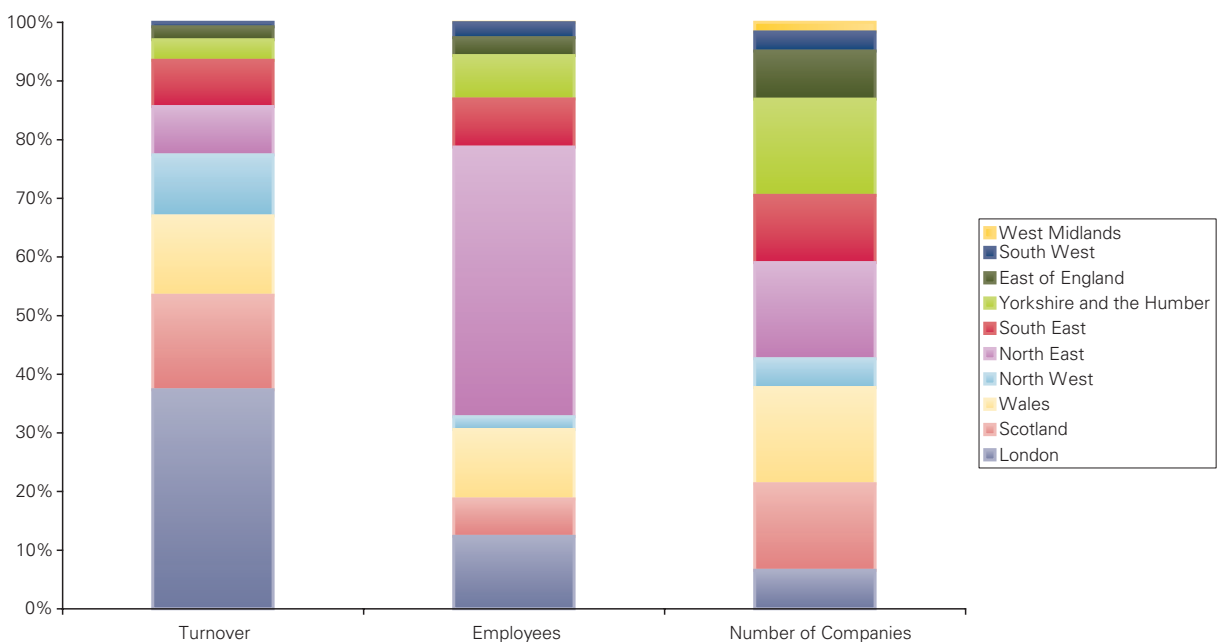
Figure 25. Profile of UK Industrial Biotechnology Sector by Company Age



4.5. Regional Analysis

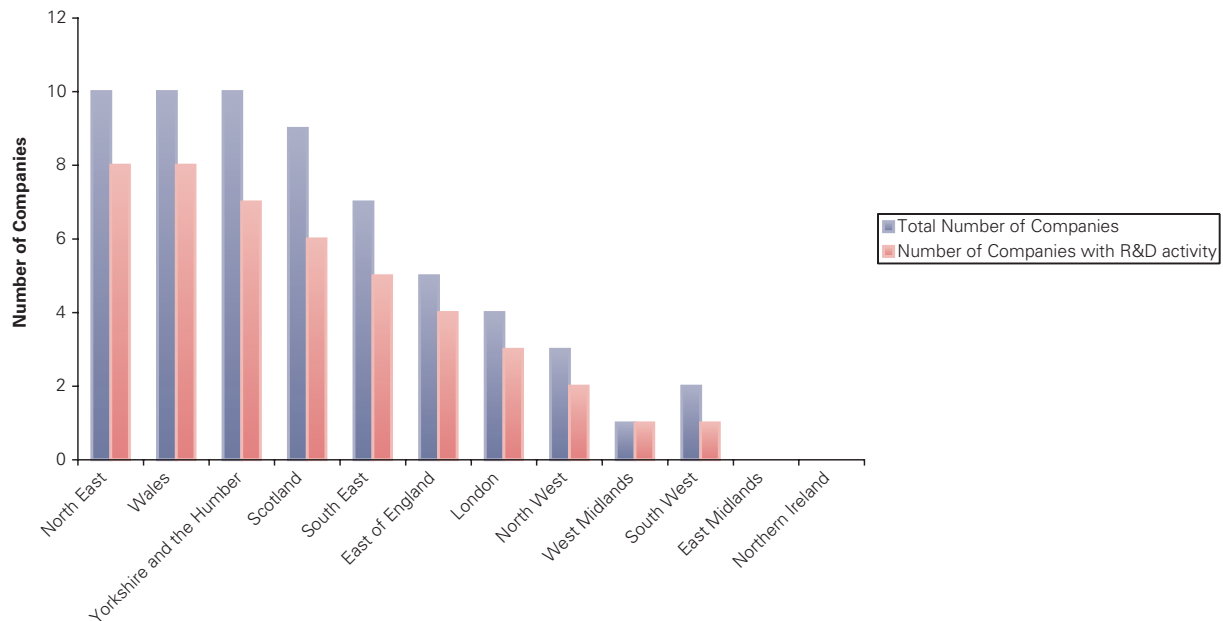
The industrial biotechnology sector is relatively small compared to the other two sectors and currently the data on economic activity across the UK shows concentrations of turnover and employment in certain regions. This is in large part due to the existence of larger companies in these regions. Figure 26 below shows the current landscape in the UK and as the sector continues to grow it would be expected that activity would spread more widely.

Figure 26. Regional distribution of Turnover, Employment and Companies for the UK Industrial Biotechnology Sector



The location of companies across the UK regions is shown in Figure 27, along with those that have research and development activity. The North East, Wales, Yorkshire and the Humber and Scotland currently contain 61% of all industrial biotechnology companies. The number of companies undertaking research and development activity is a high percentage of all companies across the regions. The location of all industrial biotechnology companies and sites across the UK is shown in Appendix II.

Figure 27. Total Number of Companies and Companies with R&D activity in Industrial Biotechnology by Region



UK Industrial Biotechnology Industry – Profile

- A total of 64 companies with a combined turnover of £230m
- The sector employs 1,600 people
- 66% of companies engaged in R&D
- 98% of all companies are SMEs
- Top 3 segments are pharmaceutical intermediates, biofuels and fine & speciality chemicals which make up 77% of all turnover and 71% of employment in the sector

Acknowledgements

The Department for Business, Innovation and Skills (BIS), the Department of Health (DH) and UK Trade and Investment (UKTI) gratefully acknowledge the contribution of the following regional and national organisations in the compilation of the Bioscience and Health Technology Database.

Region	Organisation
East of England	ERBI (Medilink East)
East Midlands	Medilink East Midlands
London	London First
North East	Centre of Excellence for Life Sciences (CELS)
North West	Medilink North West
North West	BioNoW
Northern Ireland	BioBusiness Northern Ireland (Medilink NI)
Scotland	Scottish Enterprise
South East	South East Health Technologies Alliance
South East	Oxford Biotechnology Network (OBN)
South West	BioApproaches SW
South West	SouthWest RDA
Wales	Medilink Wales
Wales	Welsh Assembly Government
West Midlands	Medilink West Midlands
Yorkshire & Humber	Medilink Yorkshire & Humber
Yorkshire & Humber	Yorkshire Forward
National	Association of British Healthcare Industries (ABHI)
National	Association of the British Pharmaceutical Industry (ABPI)
National	Association of Healthcare Technology Providers for Imaging, Radiotherapy and Care (AxRem)
National	British Healthcare Trade Association (BHTA)
National	BioIndustry Association (BIA)
National	Bio for Business Knowledge Transfer Network (KTN)
National	HealthTech and Medicines Knowledge Transfer Network (KTN)
National	British In Vitro Diagnostics Association (BIVDA)

The construction of the database used a variety of proprietary data sources that were provided under licence. The Department for Business, Innovation and Skills (BIS), the Department of Health (DH) and UK Trade and Investment (UKTI) would like to acknowledge the assistance given by the owners of these data sources.

Data Sources Used:

Data on the medical technology and medical biotechnology pipelines sourced under license from BioPharm Insight.

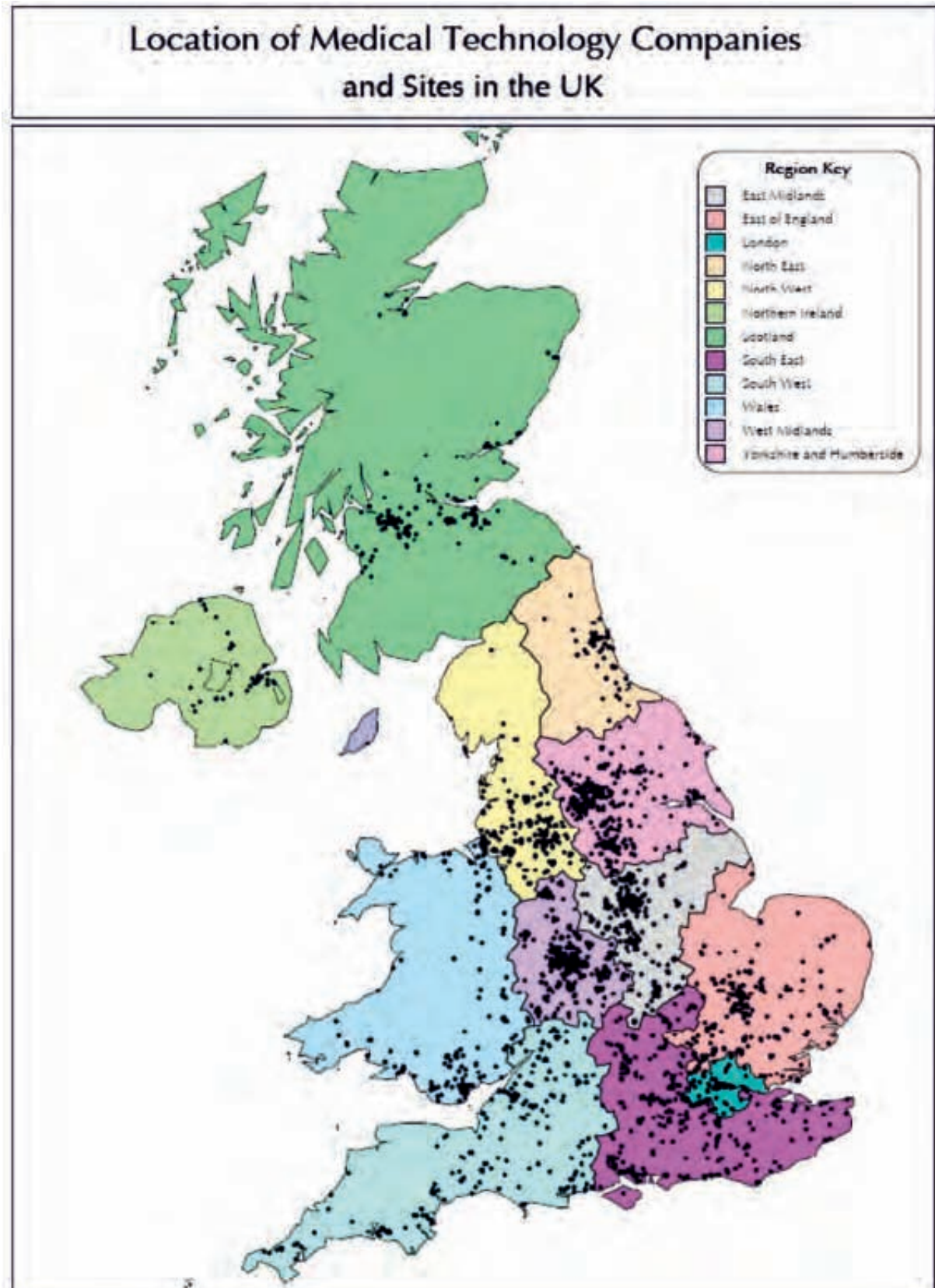
Data on funding for medical technology and medical biotechnology sourced under license from Dow Jones VentureSource.

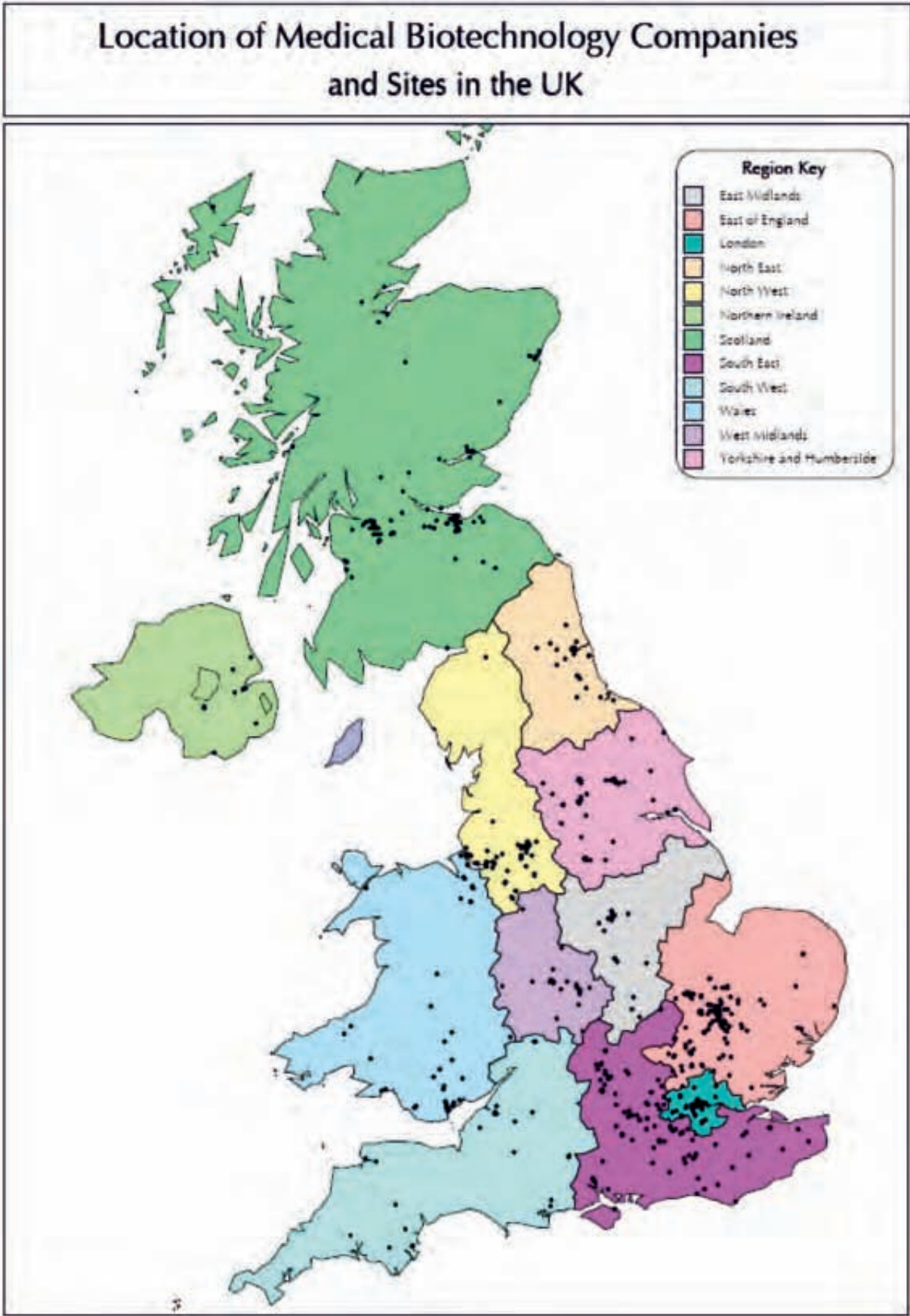
Business Information supplied under license by Dun & Bradstreet Limited and the FAME database from Bureau van Dijk Electronic Publishing.

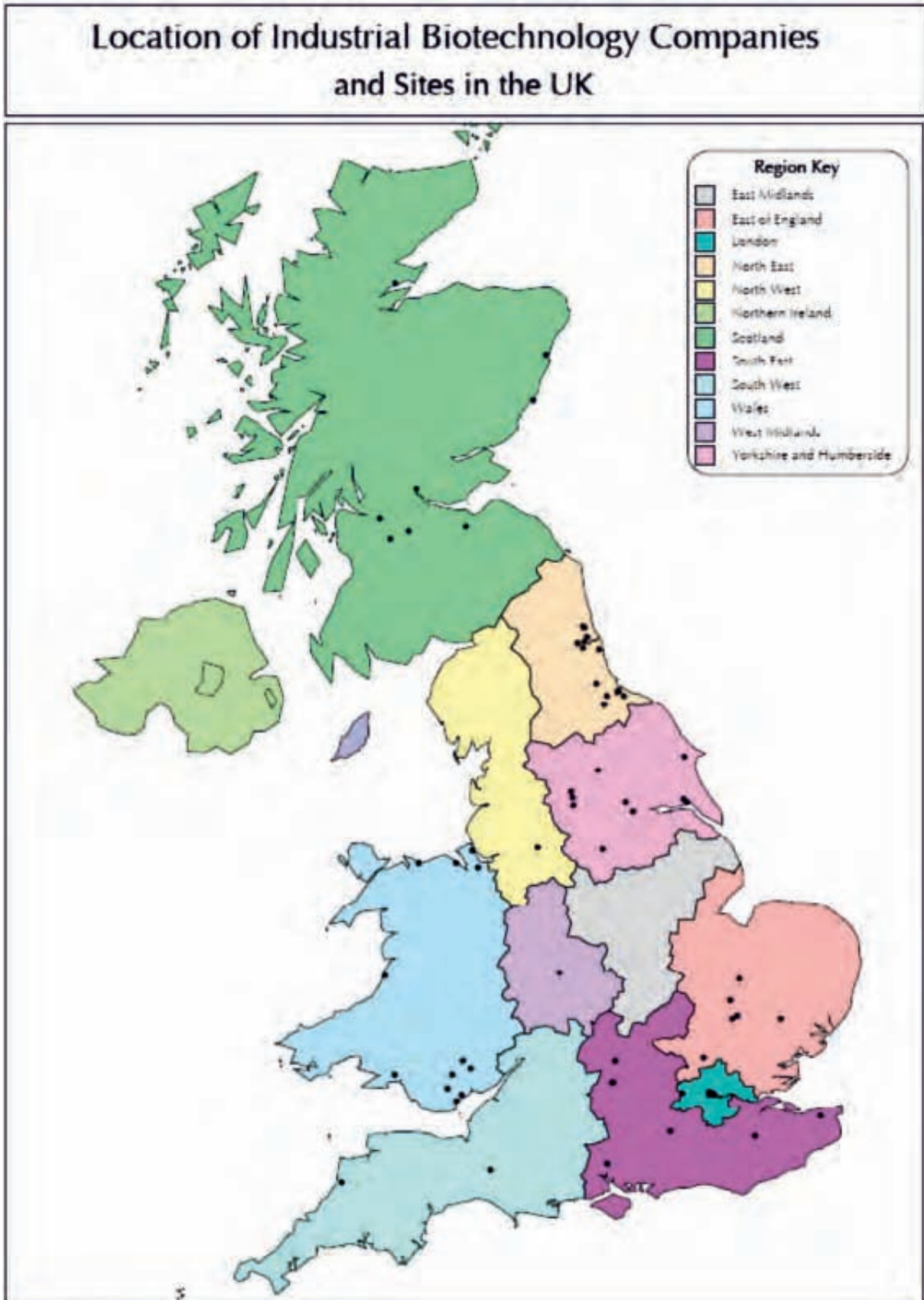
CBSL Consortium:

The database and this document were prepared and constructed on behalf of HMG by a consortium led by Cels Business Services Ltd which included Clicksquared, Kepier and Company and Lindum Research.

Distribution of Companies and Sites by Sector in the UK







Database Construction – Methodology and Statistics

Scope

The database covers the geographical area encompassed by the nine regional development areas in England and the Devolved Administrations of Northern Ireland, Scotland and Wales. Only companies that are a legal entity and are conducting economic activity and have employees are included as well as companies that are wholly or partially owned by non-UK entities. In the case of companies that also carry out economic activity in sectors or segments that lie outside of the definitions of the sectors (medical technology, medical biotechnology and industrial biotechnology), only that activity within sector or sectors is included.

Segmentation

Prior to collecting data on the companies in the three sectors, a comprehensive classification or segmentation system was designed in collaboration with the data partners and industry experts. This segmentation system enables the activities of any company to be categorised or segmented, to describe the primary and other activities which fall within the scope of the scheme.

The Segmentation scheme has three distinct elements:

- Segmentation of Technology or Service
- Segmentation of Therapeutic Area
- Segmentation of Business Activity

Segmentation of Technology or Service

This is a three level classification scheme with each level providing greater detail or definition. The top level (Level 0) analyses the Technology or Service into the three primary sectors, namely medical technology, medical biotechnology and industrial biotechnology. Subsequent levels (Levels 1 & 2) provide further analysis for each sector. See the Segmentation Reference Chart that is included as part of this Appendix.

For this first year of operation, the delivery team produced segmentation analysis for each company to Level 1, with a significant number of companies analysed to Level 2.

Segmentation of Therapeutic Area

This classification was added in response to input from the data partners. Primarily aimed at providing useful analysis for the medical biotechnology companies, the Therapeutic Area segmentation scheme was devised using reference to a number of schemes³⁶ currently adopted by other organisations. This single level scheme was devised to be compatible with the reference schemes.

For the first year of operation, most medical biotechnology companies engaged in research are categorised to at least one Therapeutic Area.

Segmentation of Business Activity

This two level classification identifies which elements of Business Activity a company provides. Level 0 provides the analysis:

- Research & Development (Including Design)
- Manufacturing
- Service and Supply Chain
- Sales/Distribution/Service/Repair

Level 1 subdivides each Level 0 segment into two further detail elements.

For the first year of operation, all companies have been analysed to Level 0.

The segmentation used to Level 1 is shown in the following table.

Segmentation Reference Chart – Level 0 & Level 1

Medical Technology	
Code	Description
MTA	Wound care and Management
MTB	In vitro diagnostic technology
MTC	Radiotherapy equipment
MTD	Medical Imaging/Ultrasound/& Materials
MTE	Anaesthetic and respiratory technology
MTF	Orthopaedic Devices
MTG	Cardiovascular and vascular devices
MTH	Neurology
MTI	Ophthalmic Devices/Equipment
MTJ	Dental and maxillofacial technology
MTK	Drug Delivery
MTL	Infection Control
MTM	Surgical Instruments (reusable)
MTN	Single use technology nec
MTO	Re-usable diagnostic or analytic equipment nec
MTP	Implantable devices nec
MTQ	Assistive Technology
MTR	Mobility Access
MTS	Hospital hardware including ambulatory
MTT	ICT+ E-health
MTU	Professional services, Consultancy
MTV	Education and Training
MTZ	Unclassified

Business Activity	
Code	Description
BAA	R & D (Including Design)
BAB	Manufacture
BAC	Service and Supply Chain
BAD	Sales and Distribution

nec = not elsewhere classified

Medical Biotechnology	
Code	Description
MBA	Antibodies
MBB	Therapeutic Proteins
MBC	Advanced Therapy Medicinal Products (ATMPs)
MBD	Vaccines
MBE	Small Molecules
MBF	Blood and Tissue Products
MBG	Specialist Services
MBZ	Unclassified

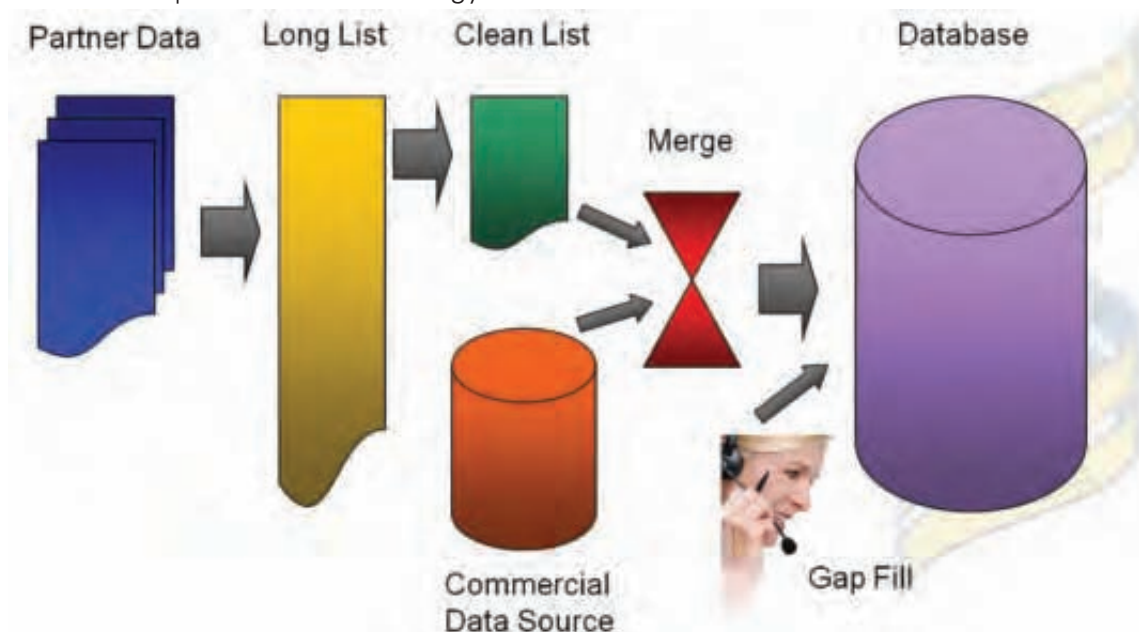
Industrial Biotechnology	
Code	Description
IBA	Biofuels
IBB	Environmental
IBC	Food and Drink
IBD	Commodity Chemicals
IBE	Fine and Speciality Chemicals
IBF	Pharmaceutical Intermediaries
IBG	Personal Care/Cosmetics
IBH	Specialist Services
IBZ	Unclassified

Therapeutic Area	
Code	Description
TA01	Anaesthesia
TA02	Cardiovascular system
TA03	Central nervous system
TA04	Ear, nose and oropharynx
TA05	Endocrine system
TA06	Eye
TA07	Gastro-intestinal system
TA08	Immune System
TA09	Infections
TA10	Malignant disease
TA11	Musculoskeletal
TA12	Nutrition and blood
TA13	Reproductive Health
TA14	Respiratory system
TA15	Skin
TA16	Other

Methodology

An overview of the database construction methodology is shown in the figure below.

Database Population – Methodology Overview



Company identity and segmentation information was gathered from 25 data partners listed in Appendix I. These individual data sets were cleansed, sorted and rationalised into a single list of companies. Once this clean list of companies had been produced, the information was assessed and moderated to ensure consistency across the merged data set.

In order to add financial, employment and ownership data to the clean list, each company was matched with the datasets held by Dun & Bradstreet and Bureau van Djke's FAME database. Once matched, information was drawn under licence from these commercial sources and added to the database.

A series of validation checks were undertaken to quality assure the data set. Where necessary adjustments have been made to the data to reflect company structures and reporting practices.

Statistics

Over 7,000 individual records were gathered from the data partners, resulting in approximately 4,000 unique records for companies which fall within the definition of scope. Approximately half of these companies report information to Companies House and this was used directly. A further 400 companies filed information which provided reference values upon which modelled data was built. Some 600 companies had no useable information filed at Companies House, and were allocated sector norms for companies trading in their first year.

Future Years

Subsequent years will involve work with the data partners to further refine the data set, whilst keeping abreast of changes in the sector (growth, decline, new starts, mergers, exits etc). Future issues of this report will allow trend data to be considered, and the information held on each company will be extended to encompass Level 2 of the Technology and Service Segmentation.

References

1. IMS Health, MIDAS, MAT Dec 2007
2. BioPharm Insight
3. Beyond Borders: Global biotechnology report 2008, Ernst & Young
4. Life Sciences Blueprint: A statement from the Office for Life Sciences, July 2009
5. Annual Business Inquiry 2007
6. ABI 2008 provisional figures, collected under SIC(2007), excludes companies whose main activity is pharmaceutical packaging
7. The Medical Device Market: United Kingdom, March 31st 2009, Espicom Business Intelligence
8. Eucomed Medical Technology Brief, May 2007
9. IMS Health MIDAS, MAT March 2009
10. <http://www.eucomed.org/~media/7804F449C2154F8E9207E8E57B19DD4B.ashx>
11. Consequences, Opportunities and Challenges of Modern Biotechnology in Europe, April 2007, JRC, European Commission
12. IMS Health, MIDAS, MAT Dec 2007
13. IMS Health Market Prognosis, Mar 2009
14. IMS Health, MIDAS, MAT Dec 2007
15. Biotechnology in Europe: 2006 Comparative Study, Critical I
16. Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy, A report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009
17. OECD: The *Bioeconomy* to 2030: Designing a Policy Agenda
18. OECD Biotechnology Statistics 2009
19. Eucomed Medical Technology Brief, May 2007
20. Pulse of the industry Medical technology report 2009, Ernst & Young
21. Source BioPharm Insight
22. Pulse of the industry Medical technology report 2009, Ernst & Young
23. Pulse of the industry Medical technology report 2009, Ernst & Young
24. The Medical Device Market: United Kingdom, March 31st 2009, Espicom Business Intelligence
25. The Medical Device Market: United Kingdom, March 31st 2009, Espicom Business Intelligence
26. Creating a step-change in bioprocessing, bioProcessUK Annual review 2008
27. IMS Health, MIDAS, MAT Dec 2007

28. Biotechnology in Europe: 2006 Comparative Study, Critical
29. Delivering New Biopharmaceutical Therapies: Challenges & Opportunities, Pharmavision, Jan 2009
30. Biotechnology in Europe: 2006 Comparative Study, Critical I
31. Beyond Borders: Global biotechnology report 2009, Ernst & Young
32. Beyond Borders: Global biotechnology report 2009, Ernst & Young
33. Beyond Borders: Global biotechnology report 2009, Ernst & Young
34. Beyond Borders: Global biotechnology report 2009, Ernst & Young
35. Dow Jones Venture Source
36. Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy, A report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009
37. Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy, A report to government by the Industrial Biotechnology Innovation and Growth Team, May 2009
38. BioIndustry Association, BioPharm Insight, British National Formulary

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