



Strength and Opportunity

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



Contents

Ministerial Foreword	1
Executive Summary	2
Introduction	6
Pharmaceutical Sector	8
Bioscience & Health Technology Database 2010	10
Chapter 1: Global Market Overviews	11
1.1 Medical Technology Market	11
1.2 Medical Biotechnology Market	11
1.3 Industrial Biotechnology Market	12
Chapter 2: Medical Technology Sector	13
2.1 Sector Definition	13
2.2 Sector Overview	13
2.3 Turnover, Employment and Segmentation	13
2.4 Company Size and Activity	19
2.5 UK Profile	20
2.6 Medical Technology Pipeline and Sector Investment	24
2.7 Trade	25
2.8 Geographical Distribution of Medical Technology Companies	26
Chapter 3: Medical Biotechnology Sector	28
3.1 Sector Definition	28
3.2 Sector Overview	28
3.3 Turnover, Employment and Segmentation	29
3.4 Company Size and Activity	33
3.5 UK Profile	35
3.6 Medical Biotechnology Pipeline	37

3.7 Sector Investment	38
3.8 Geographical Distribution of Medical Biotechnology Companies	39
Chapter 4: Industrial Biotechnology Sector	41
4.1 Sector Definition	41
4.2 Sector Overview	41
4.3 Turnover, Employment and Segmentation	42
4.4 Company Size and Activity	44
4.5 UK Profile	47
4.6 Geographical Distribution of Industrial Biotechnology Companies	48
Appendix I: Acknowledgements	50
Appendix II: Database Construction Methodology and Segmentation	52
Appendix III: Segmentation Reference Chart	54
Appendix IV: References	56

Ministerial Foreword

The UK life sciences industry is a high-tech and innovative industry which is vital to the economic prosperity and growth of the UK. Life sciences businesses will help us to meet the big societal challenges of our age from addressing the needs of an ageing population through developing advanced diagnostics and medicines, to improving our sustainability and ability to feed a growing population.

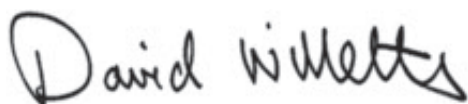
Collaboration between Government, industry and the national and regional support networks is an important component of the UK's strength in life sciences. Begun in June 2008, the database of companies active in the Medical Technology, Medical Biotechnology and Industrial Biotechnology sectors across the UK is a key example of this collaborative approach. This initiative has enhanced our understanding of these sectors and forms an important part of the evidence base on which policy development depends.

It also supports UKTI's work in promoting the UK Life Science industry to overseas procurers, investors and influencers, and a public facing Company Directory is being developed using a sub-set of the information from the database to highlight UK capabilities to both national and international markets.

The first analysis and commentary document from the database, entitled "Strength and Opportunity: The landscape of the medical technology, medical biotechnology and industrial biotechnology enterprises in the UK," was published in December 2009. We are pleased to see that many organisations and Government Departments are using the data to promote these enterprises in the UK.

Since last year's publication, the database has been updated and we are delighted to present this updated commentary, which forms the second report in an annual series. The commentary reveals the continued strength of these sectors in the UK. This covers over 4000 companies, spread across the UK, employing approximately 93,500 people and generating a turnover of nearly £19bn.

We are pleased to see the positive outcome of this continued collaboration and would like to thank all those who have given their time and expertise.



The Rt Hon David Willetts MP
Minister of State for Universities and Science
DEPARTMENT FOR BUSINESS,
INNOVATION AND SKILLS



Earl Howe
Parliamentary Under Secretary
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DEPARTMENT OF HEALTH

Executive Summary

In 2010 the medical technology and diagnostics, medical biotechnology and industrial biotechnology landscape in the UK contains just over 4,000 companies, with a combined turnover of £19bn, employing 93,500 people across the UK. The sectors overlap in terms of the technologies used in the products and services or in the market addressed. The medical and industrial biotechnology sectors are based on the application of life science for the production of new medicines and industrial processes or products. The medical technology and biotechnology sectors produce products and services for the global healthcare industry and the NHS.

This commonality of science and market applies equally to the pharmaceutical sector, which has traditionally developed medicines based on chemistry and sells into healthcare markets around the world. Over the last 10-15 years the pharmaceutical industry has increasingly applied biotechnology to enhance the discovery, development and testing of new medicines. As these technologies have been applied, new types of medicines have been developed to complement chemically derived products including those containing antibodies, DNA and stem cells. The pharmaceutical industry, with a turnover of £15bn in 2008 and employing 45,000 people shares a common heritage with the sectors covered in Bioscience & Healthcare Technology Database.

The medical technology, medical biotechnology and industrial biotechnology sectors in the UK are competing for a share of global markets which are exhibiting strong growth rates. The global medical technology market is estimated to be worth £150-170bn¹ and the proportion of healthcare expenditure spent on medical technology is increasing. The global medical biotechnology market is estimated to be worth nearly £50bn and is rapidly growing its share of the total medicines market. Worldwide interest in the application of biotechnology to industrial production has created the potential for significant growth. This market is forecast to grow to £150-360bn by 2025².

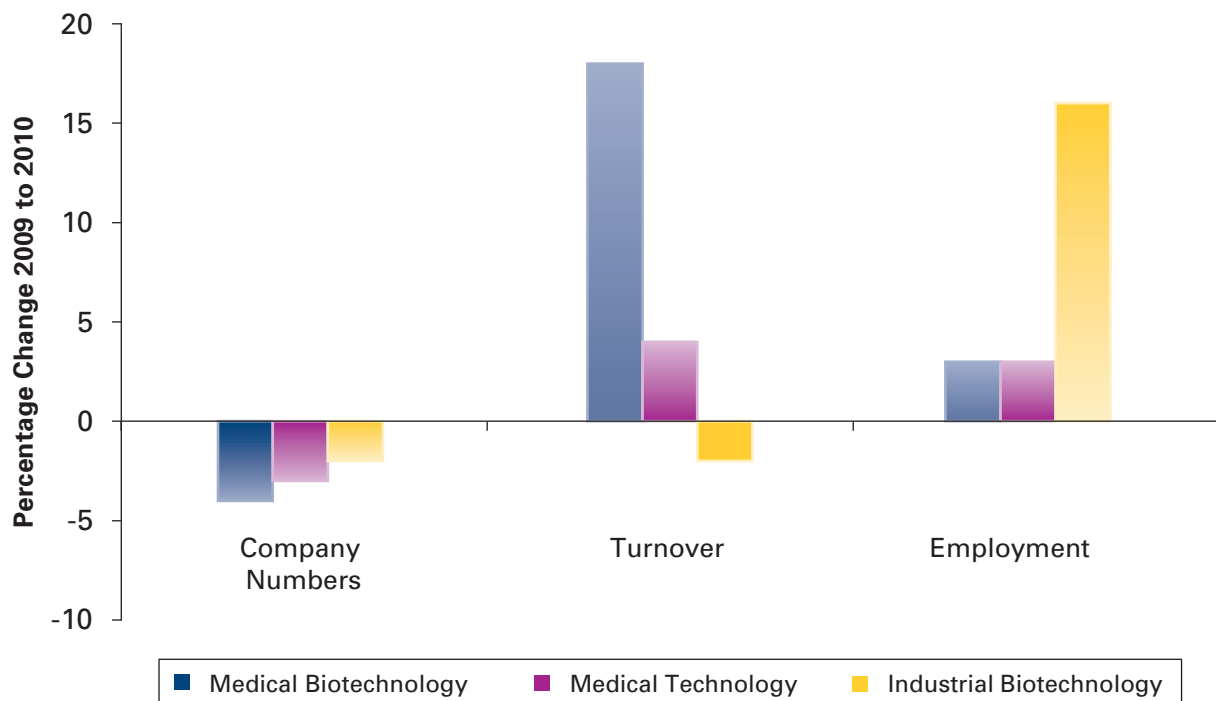
With growing multi-billion global markets, a strong UK science base and an existing company base supported by a strong supply chain, the medical technology, medical and industrial biotechnology sectors have shown resilience against the background of a global recession.

Figure 1 shows turnover, employment and company numbers comparison data between 2009 to 2010 for all three sectors. Whilst the number of companies has shown a modest decline in all three sectors due to mergers & acquisitions and companies ceasing trading, employment has increased in all three by on average 3%. Turnover comparisons show an excellent performance with medical biotechnology posting 18% growth in one year and medical technology achieving a 4% growth. A small decrease in turnover in the industrial biotechnology market and a large increase in employment of 16% suggests that this industry is emerging and continuing to invest in the capability to drive future growth.

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

2 IB 2025 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 1. Company Numbers, Turnover and Employment for the UK medical technology, medical and industrial biotechnology sectors between 2009 and 2010



Medical Technology Sector

The UK medical technology sector in 2010 consists of 3,034 companies generating a turnover of £13.1bn and employing 55,000 individuals, producing a diverse range of products from positron emission tomography for advanced imaging and diagnosis to surgical gowns and instruments. While all segments of the sector have significant turnover, the four largest segments are single use technology, in-vitro diagnostic technology, orthopaedic devices and wound care management, all with turnovers exceeding £1bn and together comprising nearly 40% of the entire sector turnover. The sector exhibits strong export performance growing 23.4% in USD in the first two months of 2010.

The sector is dominated by small medium size enterprises (SMEs) which make up 99% of the sector but has a significant number of large companies with 71 of these having more than 100 employees. The largest employment segment consists of specialist suppliers which make up a sophisticated supply chain employing 7,600 people in areas such as regulatory advice, contract design and contract manufacturing.

The year on year comparison in company numbers, turnover and employment shows a resilient sector, with a 3% decline in company numbers having a minor impact on a turnover and employment growth of 3-4%. The decline in company numbers also masks the creation of 10 new companies over the year. The aggregate growth in turnover contains some high performing segments such as the implantable devices, anaesthetic and respiratory segments which all grew by over 10%.

The medical technology sector in the UK is widely dispersed across the country as shown in the maps in Section 2.8. Concentrations of economic activity based on turnover and employment are identifiable in the West Midlands, East of England and the South East.

The industry exhibits good levels of innovation with 25% of all companies in the database indicating they are conducting research and development. Between 2004-2008, the UK industry had 80-100 medical devices gaining approval for marketing in the USA. This high level of innovation and large global markets has historically attracted investment into the sector. However, in 2008-2009 this dropped significantly against the background of a global recession.

Medical Biotechnology Sector

In 2010 the UK medical biotechnology sector consists of 942 companies generating a turnover of £5.5bn and employing 36,700 people. The sector uses a range of technologies from chemistry to the latest developments in stem cell science to produce medicines and other therapeutics to treat disease such as cancer, central nervous system disorders and infections. Over 50% of companies use the latest biotechnologies such as gene therapy and stem cells. The largest segment in terms of turnover at £2.6bn, are the 557 specialist suppliers that include contract research organisations, manufacturers and suppliers of specialist technology services such as genomics and proteomics. This complex supply chain supports companies developing and marketing medicines, that generate a turnover of £2.7bn, with small molecule, antibody and therapeutic protein companies representing the largest segments. Across the sector, 63% of all companies have activity in central nervous system, oncology, infection and immune therapies.

The sector is composed of 97% SMEs and 28 larger companies that employ 250 or more employees. The UK is home to 165 medical biotechnology companies with a turnover in 2010 of greater than £5m. The sector has a mix of start-up and established companies with 14% companies less than three years old and 42% established for over 10 years. The advanced therapy medicinal products or regenerative medicine segment contains the youngest companies.

The sector shows rising turnover and employment progression, with an 18% growth in turnover and a 3% growth in employment between 2009 and 2010. The small molecule, therapeutic proteins and specialist services (which includes Contract Research Organisations and Contract Manufacturing Organisations) all achieved over 10% growth in turnover between 2009 and 2010. However, the sector had a 4% drop in the number of companies.

The sector shows greater geographical concentration than the medical technology and industrial biotechnology sectors, with the East of England accounting for 27% of all turnover, 24% of all employees and 24% of all companies. Other major concentrations of economic activity are to be found in Scotland and the North West of England.

The UK medical biotechnology sector has a strong track-record in taking products from research into development. An analysis of the pipeline of products for the companies in the database shows 465 therapies in all stages from discovery to regulatory filing. Small molecule products are the largest class and 46% of all products are based on the advanced biotechnologies such as proteins, antibodies and gene therapy.

Industrial Biotechnology Sector

The UK has a number of companies that are developing, manufacturing and marketing industrial products and services based on biotechnology. This sector of companies is key to the development and scale-up of industrial biotechnology and its adoption into the wider industrial manufacturing sector. There are 55 companies in the UK whose prime activity and turnover is derived directly from the application of biotechnology to make industrial products. The sector shows a turnover of £308m in 2010 and employs over 1000 people. Not captured in these numbers is the economic activity that is associated with the use of the products or processes produced by these companies. For example, the production of a pharmaceutical intermediate by a large pharmaceutical company using an enzyme developed and sold by one of these 55 companies would not be included.

Fine & speciality chemicals, food & drink, and biofuels make up the largest number of product and process companies, representing 48% of the sector turnover. These companies are supported and complemented by a group of specialist suppliers providing items such as engineering equipment, design and analytical services. The most frequently employed technology across the sector is fermentation followed by biomass processing. An analysis of the business activities of companies shows that a majority are involved in research & development and manufacturing.

The industrial biotechnology sector is mainly composed of SMEs with 86% of the companies being formed over four years ago.

Overall between 2009 and 2010, the comparison shows a large increase in employment of 16% and a 2% decrease in turnover. These numbers mask a strong performance in the pharmaceutical intermediates segment and a 19% decrease in turnover for biofuel companies.

The small number of companies makes conclusions about geographical concentration in the UK of limited value. Initial observations show large percentages of the UK turnover located in the North West of England and in Yorkshire and Humberside.

Introduction

The UK life sciences industry is an example of a high-tech and innovative industry where excellence in science is translated into commercial success, requiring highly skilled workers and strong collaboration between industry, academia and the public sector. The industry brings the UK economic growth and job creation, as well as broader social and environmental benefits. The industry has a major contribution to the delivery of high-quality healthcare, modern manufacturing and industrial processes and to the transition to a low carbon economy.

The UK's life sciences industry has strengths across all of its sectors and those in the medical technology, medical biotechnology and industrial biotechnology sectors are clearly demonstrated in this report. The medical biotechnology sector leads Europe in the number of drugs in all stages of clinical development³. The UK medical technology industry is the second largest in Europe⁴ and has a strong track record of innovation. Currently UK companies lead Europe in having the most number of devices undergoing clinical development for registration in the US⁵.

Industrial biotechnology is starting to provide economic benefits to companies through lower operating costs, increased productivity and a reduced environmental footprint. Indeed, this emerging technology has the potential to play an essential part in the creation of a low-carbon knowledge based bio-economy in the UK. It is expected that biotechnology in industry and primary production will contribute to 2.7% of the GDP across OECD countries by 2030 (in contrast to less than 1% in 2004)⁶.

The need for better industry data to allow policy makers to understand more fully the medical technology, medical biotechnology and industrial biotechnology sectors was raised by various government and industry initiatives. The Standard Industrial Classification (SIC) codes used by the Office for National Statistics (ONS) do not provide a comprehensive picture of the life sciences industry and its specialist support organisations.

The Department for Business Innovation and Skills (BIS), the Department of Health (DH) and UK Trade and Investment (UKTI) collaborated with the regional and national networks that support these sectors, to develop a database of companies that are active in the UK in the medical technology, medical biotechnology and industrial biotechnology sectors. The Biotechnology and Health Technology Database is now in use across these three government departments.

This comprehensive in-house data resource is improving the understanding of these sectors and facilitating effective and evidence based policy development that is benefiting industry. Furthermore, UKTI 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.

3 Beyond Borders. Global biotechnology report 2009. Ernst and Young

4 EUCOMED Medical Technology Brief 2007

5 BioPharm Insight

6 OECD: The Bioeconomy to 2030. Designing a Policy Agenda

This report is the second in the series that analyses the information contained in the database, supplemented by data from other sources. The report uses the updated 2010 data set and allows policy makers to compare against last year's information to see how these sectors are changing. The detailed analysis of each sector is contained in the individual chapters. The sector and sub-sector definitions, the methodology used and summary statistics about the database are contained in Appendices II and III.

Pharmaceutical Sector

As the life sciences industry has grown over the last 20 years, the sector classification of pharmaceutical, biotechnology and medical technology has become increasingly blurred. Pharmaceutical companies were traditionally defined as companies that developed drugs based on the discovery and development of small molecules. Increasingly, as the potential and success of so called large molecules such as peptides, antibodies and nucleic acids has been demonstrated, the portfolios of pharmaceutical companies have changed to accommodate these new technologies.

The changes in the healthcare market over the last 10 years has challenged many of the business models of the pharmaceutical companies who have responded by embracing the new technologies of biotechnology and diversifying into areas such as diagnostics and consumer healthcare. With this continuing trend it has become increasingly difficult to separate pharmaceutical business from biotechnology. Equally, large biotechnology companies are not excluding small molecules from their portfolios and all companies involved in life sciences apply biotechnology tools and techniques in the discovery and development of new therapies.

The Bioscience & Health Technology Database excludes the activities of large pharmaceutical companies in the discovery and development of small molecule drugs but includes data on their biologics activities where this can be separately identified. To provide a more complete picture of the UK life sciences industry, key data on the pharmaceutical sector is summarised below to complement the data emerging from the database.

Many of the world's leading pharmaceutical companies have significant manufacturing and/or R&D operations in the UK. Two leading companies, GSK and AstraZeneca, have their corporate headquarters here and the world's largest pharmaceutical company, Pfizer, has its only major R&D centre outside the US at Sandwich in Kent.

Figures from the Business Enterprise R&D survey show that 27,000 people⁷ were employed in industry-based pharmaceutical R&D in the UK in 2008.

In 2008, around 45,000 people were employed in 375 companies for which the primary activity is classed as pharmaceutical manufacturing⁸. This may exclude companies for which the primary focus in the UK is non-manufacturing activities such as R&D or regulatory work and employment in companies such as Contract Research Organisations (CROs) to which pharmaceutical companies are increasingly outsourcing activities, such as R&D, regulatory, administrative and marketing functions.

7 Full Time Equivalents. ONS Business Enterprise Research & Development 2008

8 ONS Annual Business Inquiry 2008, data collected under SIC 2007

Pharmaceutical manufacturing companies had a turnover of £15.2bn in 2008 and accounted for £8.6bn in Gross Value Added (GVA), some 5.76% of all manufacturing GVA⁹. Pharmaceutical exports in 2009 were £21.3bn (up from £18bn in 2008), the largest of any manufacturing category with a positive trade balance overall of £7.2bn¹⁰ (Note: exports apparently exceed turnover, however not all exports of pharmaceuticals will have originated with those companies classified primarily as pharmaceutical manufacturers in the Annual Business Inquiry).

Pharmaceutical companies spent £4.3bn in the UK in 2008 on internal R&D, funding 27% of all such industrial R&D in the UK. A further £824m was spent on external R&D within the UK. Of the £4.3bn spent on internal R&D, £227m was capital expenditure and £1.7bn on salaries and wages¹¹. There is more pharmaceutical R&D spend in the UK than any other European country and approximately 20% of European R&D spend in 2008 was in the UK¹². Globally, only the US and Japan account for more pharmaceutical R&D spend¹³.

9 ONS Annual Business Inquiry 2008. data collected under SIC 2007

10 ONS UK Trade in Goods Analysed in Terms of Industry

11 ONS Business Enterprise Research & Development 2008

12 European Federation of Pharmaceutical Industries and Associations 2010

13 OECD STAN R&D Expenditure in Industry (ISIC Rev.3) – ANBERD ed 2009

Bioscience & Health Technology Database 2010

After the completion of the Bioscience & Health Technology database construction and the publication of the commentary document in December 2009, a review of the database content was undertaken. As a result of this analysis, a number of adjustments were made to the 2009 dataset to improve the accuracy following comments received from the data partners. As a result of these changes, the 2009 dataset was adjusted to include 445 companies that were now deemed to be in scope (i.e. approximately 10% or more of their turnover could be attributed to one of the major segments). 85 companies were removed from the database as these were deemed to be duplicates or out of scope.

In addition to the changes to companies included in the database, the turnover in scope of 65 companies was adjusted to better reflect their activities. These turnover changes were primarily for larger companies with a turnover of greater than £50m. Company financial data was improved across the 2009 data set due to better matching of the data received with external sources. These changes included financial data on 476 of companies in the 2009 dataset.

The overall impact of these changes is that the database in 2010 contains 4,220 individual company sites with a total turnover of all activity in scope of £19bn.

In total there are 1,740 companies in the database with 2009 and 2010 financial information. Turnovers within these companies account for a total of £13.5bn and therefore cover a significant portion of total turnover. Financial information on all companies in the database is not possible due to the exemptions allowed to small companies to file abbreviated accounts. There are 3,084 companies with information on employment for both years, accounting for a total of 64,140 employees. Therefore, where comparisons are presented in the commentary, it is based on a subset of the total number of companies in the database.

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 technologies. 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 2015¹⁴. 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 technology¹⁵. 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 people¹⁶.

1.2. Medical Biotechnology Market

The explosion of knowledge and understanding of biology including genetics, biochemistry and physiology has enabled innovative companies to develop new, effective and safe treatments 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 the analysis in this commentary 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, drugs developed from large molecules are the fastest growing group, currently accounting for 17% of global pharmaceuticals sales¹⁷. 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 product¹⁸. The global medical biotechnology market is estimated to be worth £45-48bn with growth rates of more than 20% per annum between 2002-07 which is more than double the rate for the pharmaceutical market¹⁹. The USA is the largest single market with 65% of all sales, followed by Europe which represents 30% of the global market²⁰. The major classes of products are, erythropoietins, anti-cancers, and anti-diabetic treatments accounting for some 45% of all sales²¹.

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

15 Eucomed Medical Technology Brief, May 2007

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

17 IMS Health, MIDAS, MAT Mar 2009

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

19 IMS Health, MIDAS, MAT Mar 2009

20 IMS Health, MIDAS, MAT Mar 2009

21 IMS Health, MIDAS, MAT Mar 2009

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 development²².

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-wide²³. This strong growth potential is driven by the ability to provide alternative production processes for oil or gas based chemicals. For example, 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 2007²⁴.

22 Biotechnology in Europe: 2006 Comparative Study, Critical I

23 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

24 OECD Biotechnology Statistics 2009

Medical Technology Sector

2.1. Sector Definition

The definition used for companies included in the medical technology and diagnostics 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) and companies who have significant activity, defined as more than 10% of their turnover, in supplying specialist services into the sector. Examples of companies in the professional services segment include those providing regulatory advice or design consultancy to medical technology companies. These companies represent a vital part of the overall supply chain and 14% of the sector employment. This sector definition is wider than that typically adopted which tends to primarily focus on the regulatory definition of a medical device. However, in the context of analysing the overall economic impact and trend of the medical technology sector, it is important to include companies that provide vital services to companies whose primary activity is the development, manufacturing and selling of medical technology.

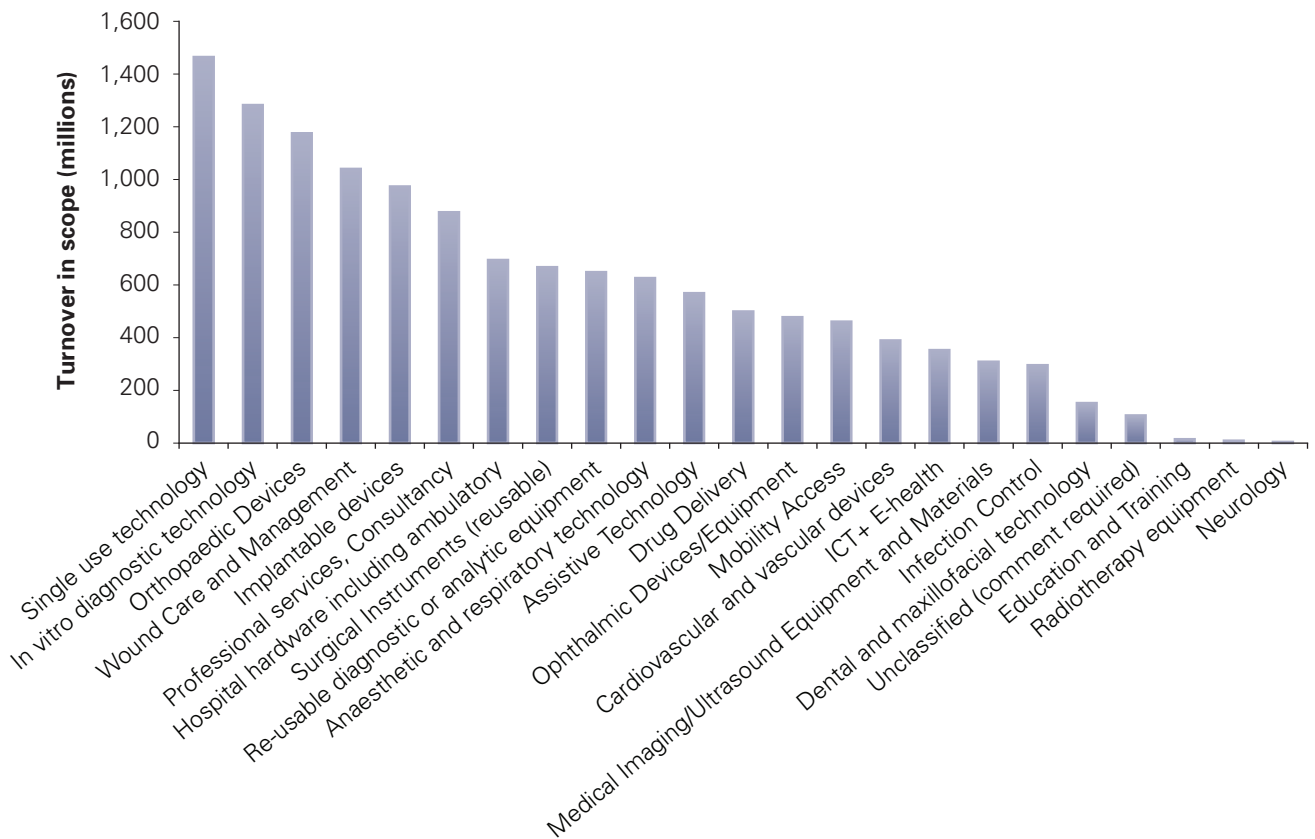
2.2. Sector Overview

In 2010 the UK medical technology sector within the Bioscience & Health Technology Database, contains 3,034 companies, which employ over 55,625 individuals and have a combined annual turnover of £13.1bn. Single use technology, in-vitro diagnostics, orthopaedic devices and wound care are the four largest segments all with turnovers greater than £1bn. There has been a 3% decrease (a loss of 82 companies) in the number of medical technology companies between 2009 and 2010 although this masks the formation of 10 new companies in the year. The sector has experienced a 3% increase in the number of employees and a 4% increase in turnover in the sector, led by ophthalmic devices and implantable devices companies respectively.

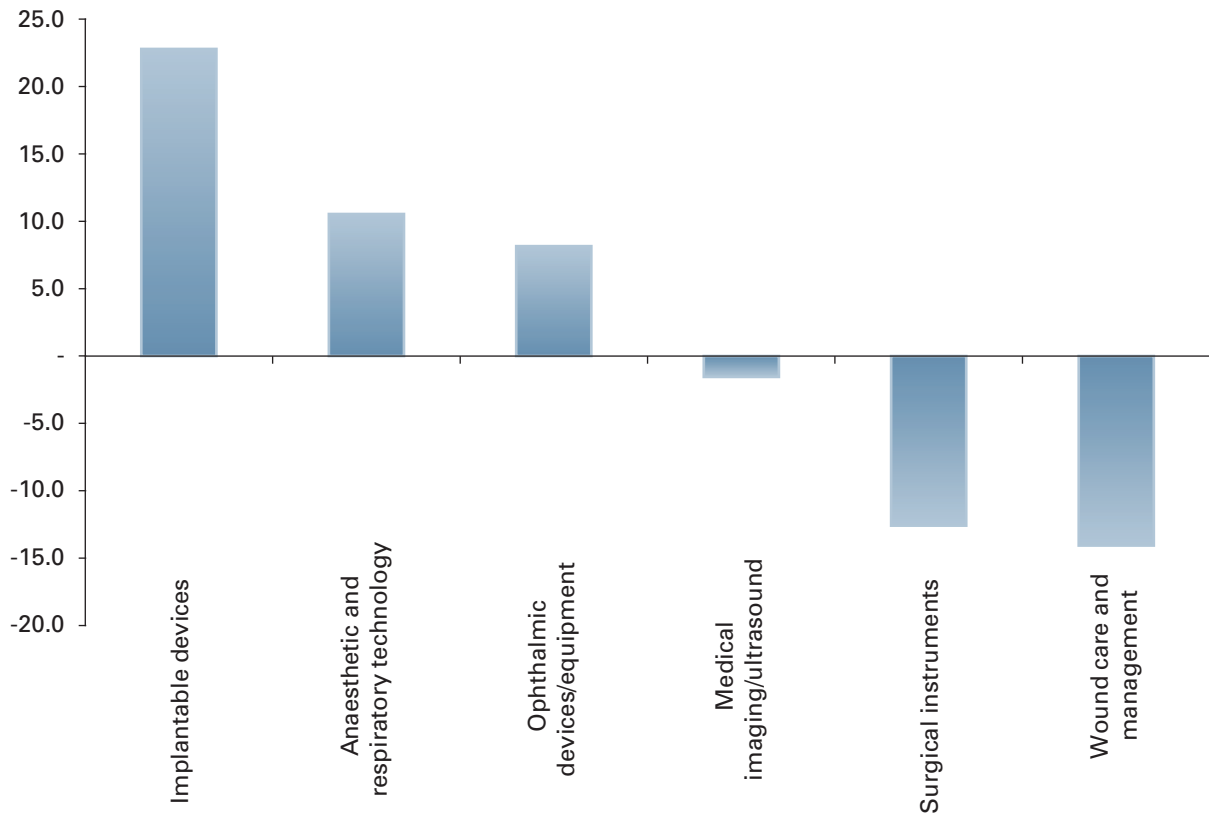
The sector is widely distributed across the UK, with concentrations of turnover and employment in the West Midlands, East of England, and the South East. The sector is dominated by SMEs who make up 99% of all companies in the sector. Within this number there are 425 companies with turnover greater than £5m.

2.3. Turnover, Employment and Segmentation

The total turnover within each segment is shown in **Figure 2**. Single use technology, in vitro diagnostic technology, orthopaedic devices and wound care management are the top four segments by turnover, with combined sales totalling almost £5bn in 2010. The top segments are consistent with those highlighted in 2009. However, single use technologies have risen from 4th to 1st, while wound care has fallen from 1st to 4th place. This is a consequence of a drop in UK turnover in the wound care market. These four segments make up 38% of the total UK turnover in medical technology compared to 40% in 2009.

Figure 2. Turnover by medical technology segment in the UK

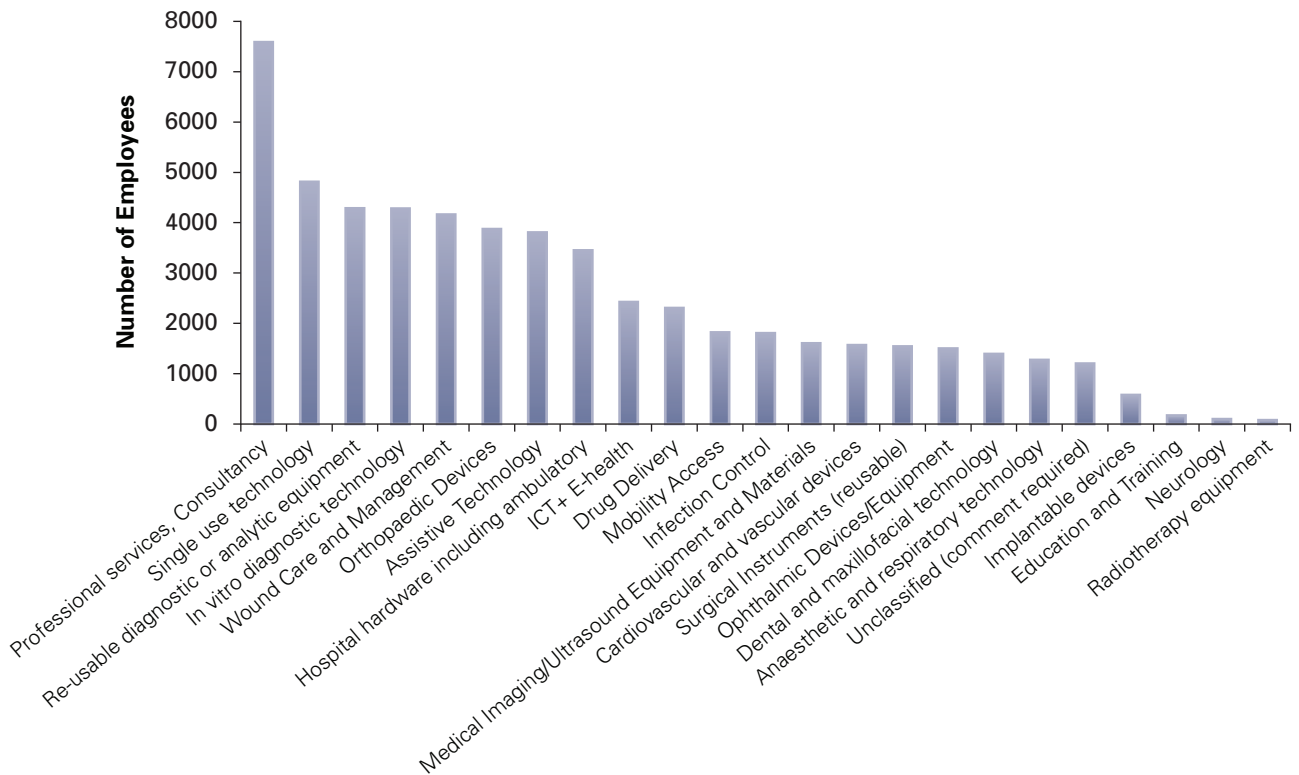
The comparative analysis between 2009 and 2010 is based on 1351 companies for which financial data is available for 2009 and 2010 and shows a 4% increase in turnover. Analysis of the best and worst performing segments by turnover (**Figure 3**) shows that the implantable devices segment has seen the highest increase (23%), followed by anaesthetic and respiratory technology (11%) and ophthalmic devices (8%). The segments which have seen the largest drops in turnover are wound care and management (14%), surgical instruments (13%) and medical imaging/ultrasound (2%).

Figure 3. Turnover in Medical Technology: Top and bottom 3 segments

The distribution of employment across all the segments gives a different ordering and this can be seen in **Figure 4**. As in the 2009 commentary document, professional services employ the largest proportion of individuals with 7,585 employees. In the database, professional services cover a wide range of activities that are part of the extended supply chain and are vital to the efficient operation of the sector. The largest activities within professional services by employment are companies offering regulatory advice, legal services and the provision of servicing and maintenance representing 7.5%, 7.1% and 3.7% respectively of all employment in the segment.

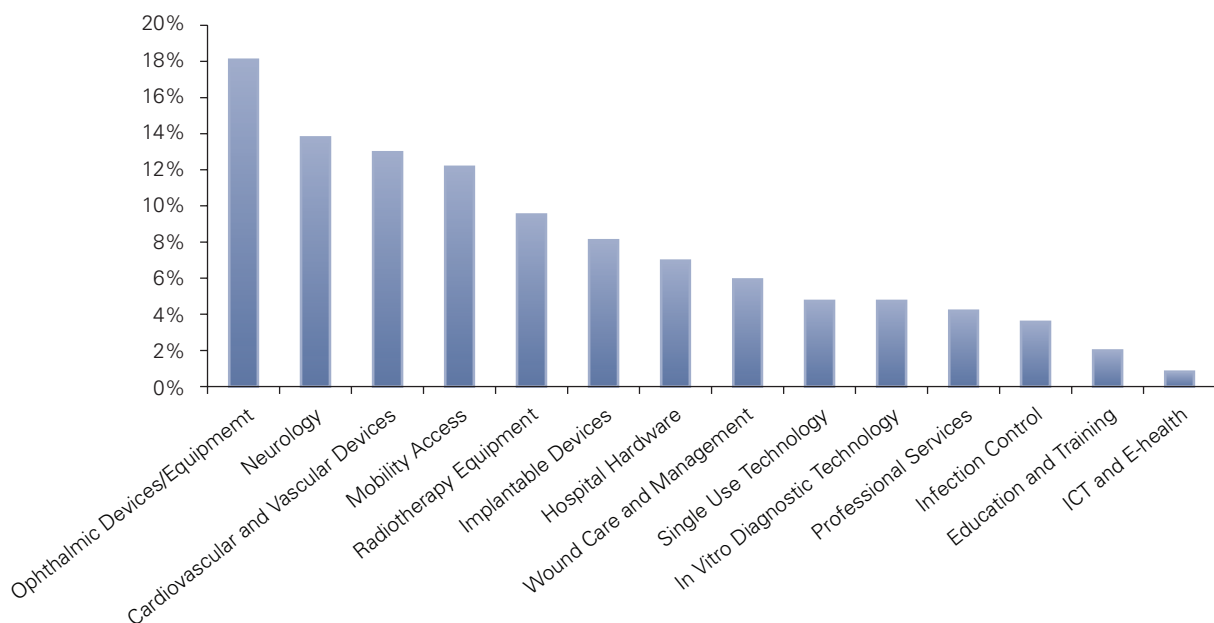
The other top employment areas within medical technology are single use technology, re-usable diagnostics or analytical equipment and in vitro diagnostic technology. These segments, along with wound care, orthopaedic devices, assistive technology and hospital hardware all have similar numbers of employees ranging between 3500 and 4800 and they form the bulk of employers in the medical technology sector.

Figure 4. Employee numbers by medical technology segment in the UK



The comparison of the employment numbers in medical technology between 2009 and 2010 is based on 2328 companies (which represent 77% of the total number of medical technology companies within the database) and is shown in **Figures 5 and 6**. This shows that employment has increased by 3% across the medical technology sector. There are 14 segments in which employment has increased, two segments where it has remained static and six segments where employment has fallen. The segment with the largest employment increase in the past 12 months is ophthalmic devices which has seen an 18% increase in its employment, followed by neurology with 14% and cardiovascular and vascular devices with 13%.

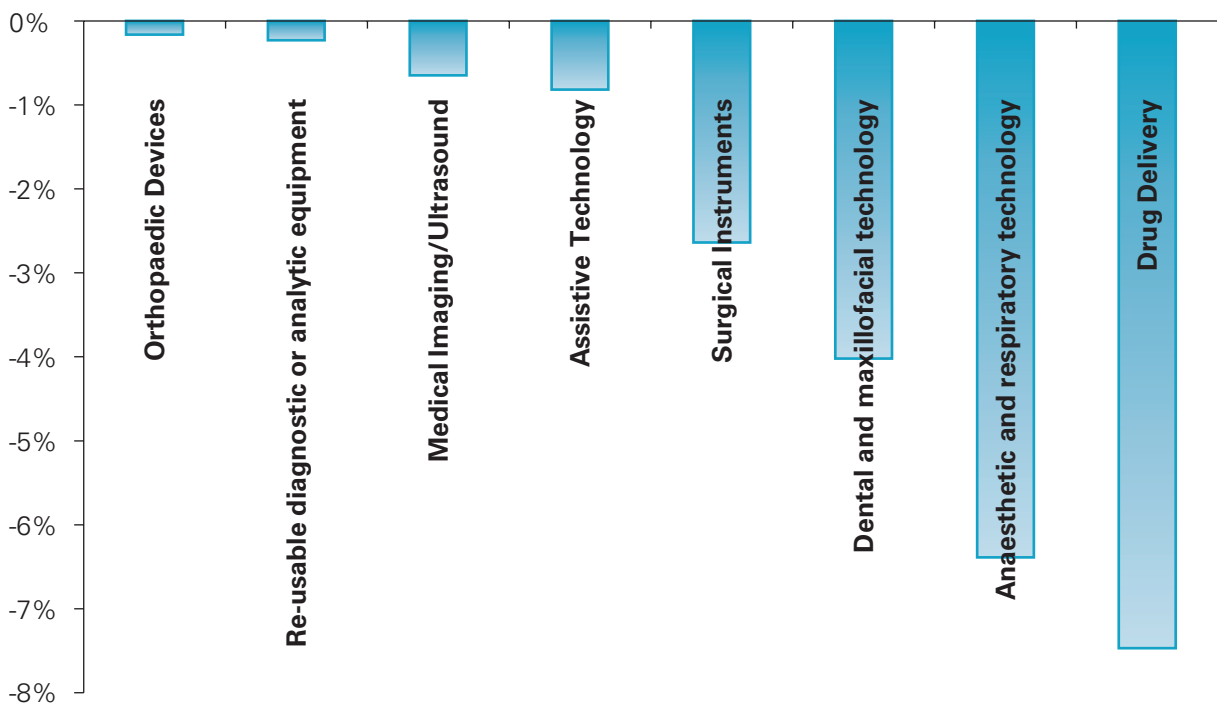
Figure 5. Medical technology employment: Segments with increased employment



The segment that has seen the steepest decline in employment figures is drug delivery, which has seen a 7% drop. This is followed by anaesthetic and respiratory technology (6% decrease) and dental and maxillofacial technology (4% decrease).

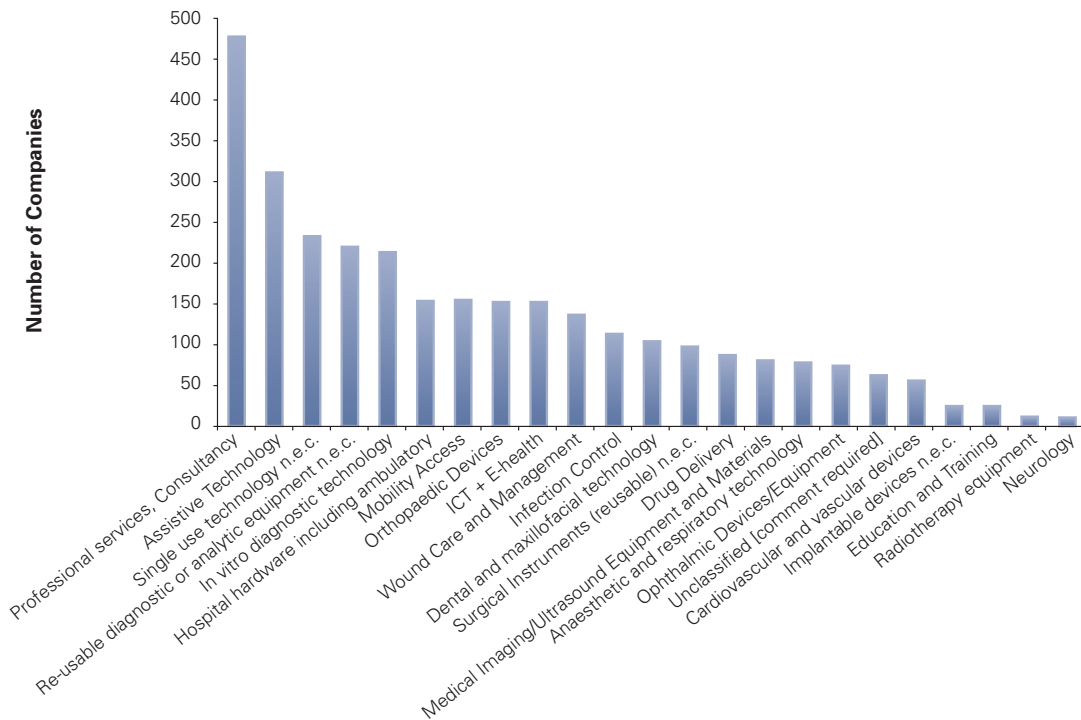
Comparing the turnover and employment data by segment shows no discernible correlation between the two numbers. There are examples of segments where turnover has increased with employment and examples of a negative correlation. More annual data points would be required to detect emerging trends.

Figure 6. Medical technology employment: Segments with static or decreased employment



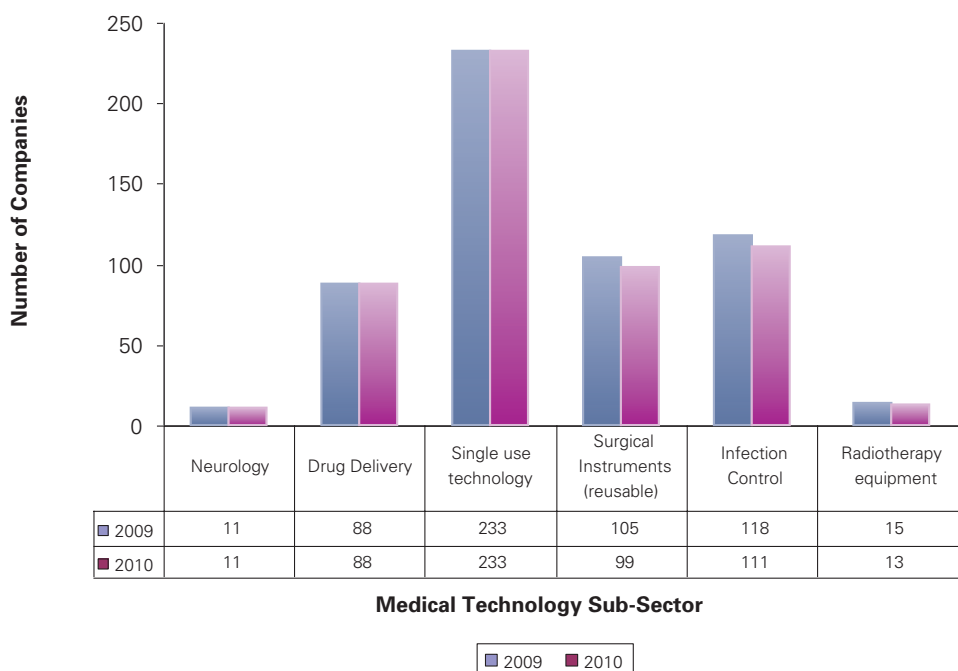
The distribution of the number of companies in each segment gives another indication of the sector as a whole and is shown in **Figure 7**. Once again, as last year the professional services and consultancy segment contains the most companies. Within this segment regulatory advice, legal advice and maintenance companies represent the largest sub-segments. Unsurprisingly given the modest change in the total number of companies between 2009 and 2010 (3% decrease see **Figure 8**) the order of segments by the number of companies has not changed.

Figure 7. Company numbers by medical technology segment in the UK



The total number of companies involved in medical technology has dropped 3% between 2009 and 2010. This overall number does mask the creation of 10 new companies, a figure that is lower than the average of 28 per year up to 2009 highlighted in a recent report²⁵. No individual segment has increased in overall company numbers in 2010 while a number have shown a small decrease over the same time frame. **Figure 8** shows the three highest and three lowest performing segments in this regard between 2009 and 2010. Companies providing reusable surgical equipment, infection control and neurology have seen the largest overall changes in company numbers with a percentage loss of 6%, 6% and 13% respectively.

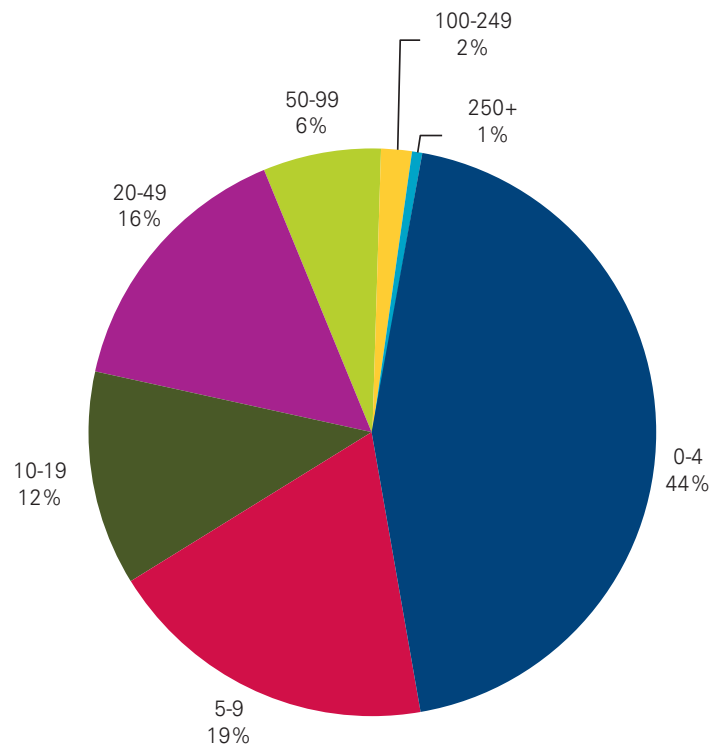
Figure 8. Company number changes by medical technology segment in the UK



2.4. Company Size and Activity

The vast majority of companies in the medical technology sector are small to medium size enterprises (SMEs), with less than 250 employees. The overall distribution is shown in **Figure 9**. In the UK, the data available for 2010 shows that 99% of medical technology companies are SMEs which is consistent with the figure from 2009. Within the sector, 63% are micro-companies (employing less than 10 people), which compares to 67% in 2009. Given that this represents a comparison over 12 months, it is not surprising that this distribution has not changed significantly. In the UK there are 71 medical technology companies that have 100 or more employees. This employee per company distribution is similar to that of all industries in the UK where 99.8% of all companies have less than 250 employees²⁶. However, the medical technology sector does have a relatively lower percentage of micro-companies; 63% compared to 90% for all UK manufacturing²⁷.

Figure 9. *Distribution of medical technology companies by employee bands*



The distribution of total turnover within the sector shows that 92.5% of all medical technology companies, for whom financial data is available, have a turnover in the range of £100k-£5m. The UK is home to 425 companies in this sector that have an annual turnover of over £5m.

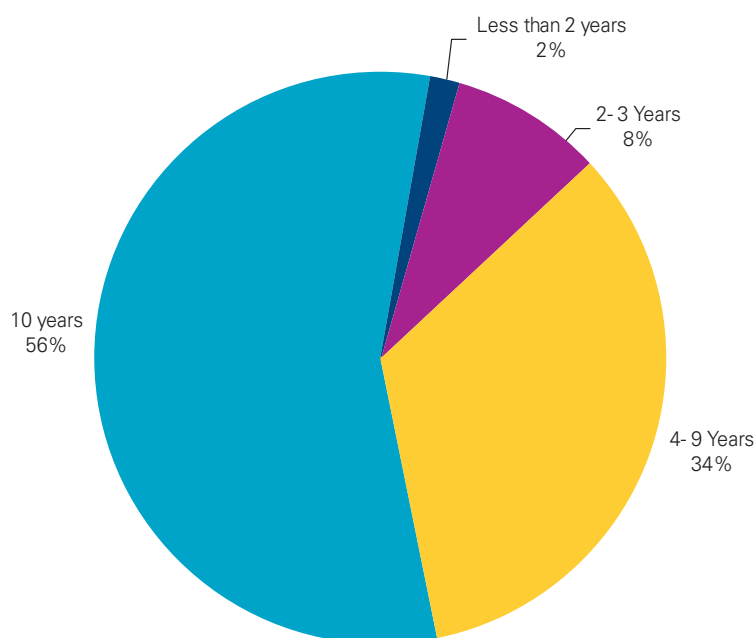
²⁶ Small and Medium Enterprise Statistics for UK and the Regions, BIS: <http://stats.bis.gov.uk/ed/sme>

²⁷ Small and Medium Enterprise Statistics for UK and the Regions, BIS: <http://stats.bis.gov.uk/ed/sme>

25% of companies identified, indicated that they are conducting research and development activity. This figure has stayed consistent from 2009. Data collected through the standard methodology included financial information on the research and development expenditure per company. However, on further analysis of these figures, it is clear that in aggregate, they do not give an accurate figure. The accounting definitions and practices for recording R&D expenditure vary for all industries and makes collection of this data for non-listed companies difficult. 44% of all medical technology companies within the UK have active manufacturing activities. Again this figure has stayed consistent from 2009 to 2010.

The age profile of companies within the medical technology sector (as illustrated in **Figure 10**) shows that the majority of companies are well established, with 56% of all medical technology companies being over 10 years old. Drug delivery (3.5%) and mobility access companies have the greatest proportion of very young companies (less than two years old) while ophthalmic devices (72.5%) and reusable surgical equipment (64.2%) have the greatest proportion of established companies (10 years or more).

Figure 10. Profile of UK medical technology sector by company age



2.5. UK Profile

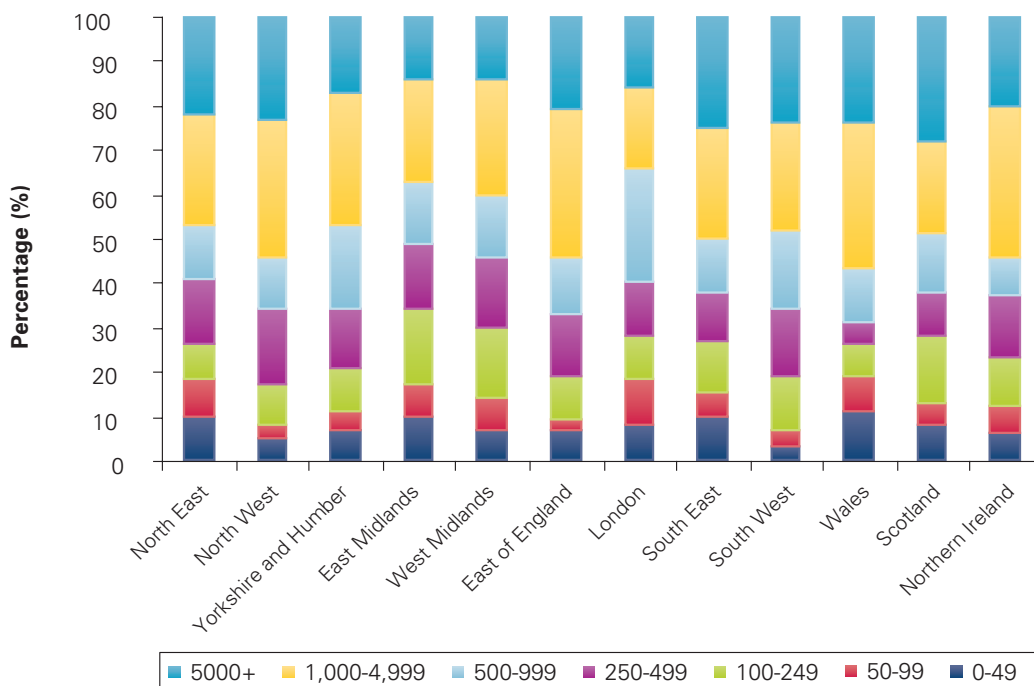
All parts of the UK have company activity within the medical technology sector. **Figure 11** shows a combination of turnover, employees and number of companies within the medical technology sector in the UK. The distribution shows that there is no clear link between the number of companies within a region and the number of employees or turnover. However, a significant proportion of the turnover in scope (20%) within medical technology is generated from companies based in the South East of England despite only having 12% of the total number of companies.

Figure 11. Distribution of turnover, employment and companies for the UK medical technology sector



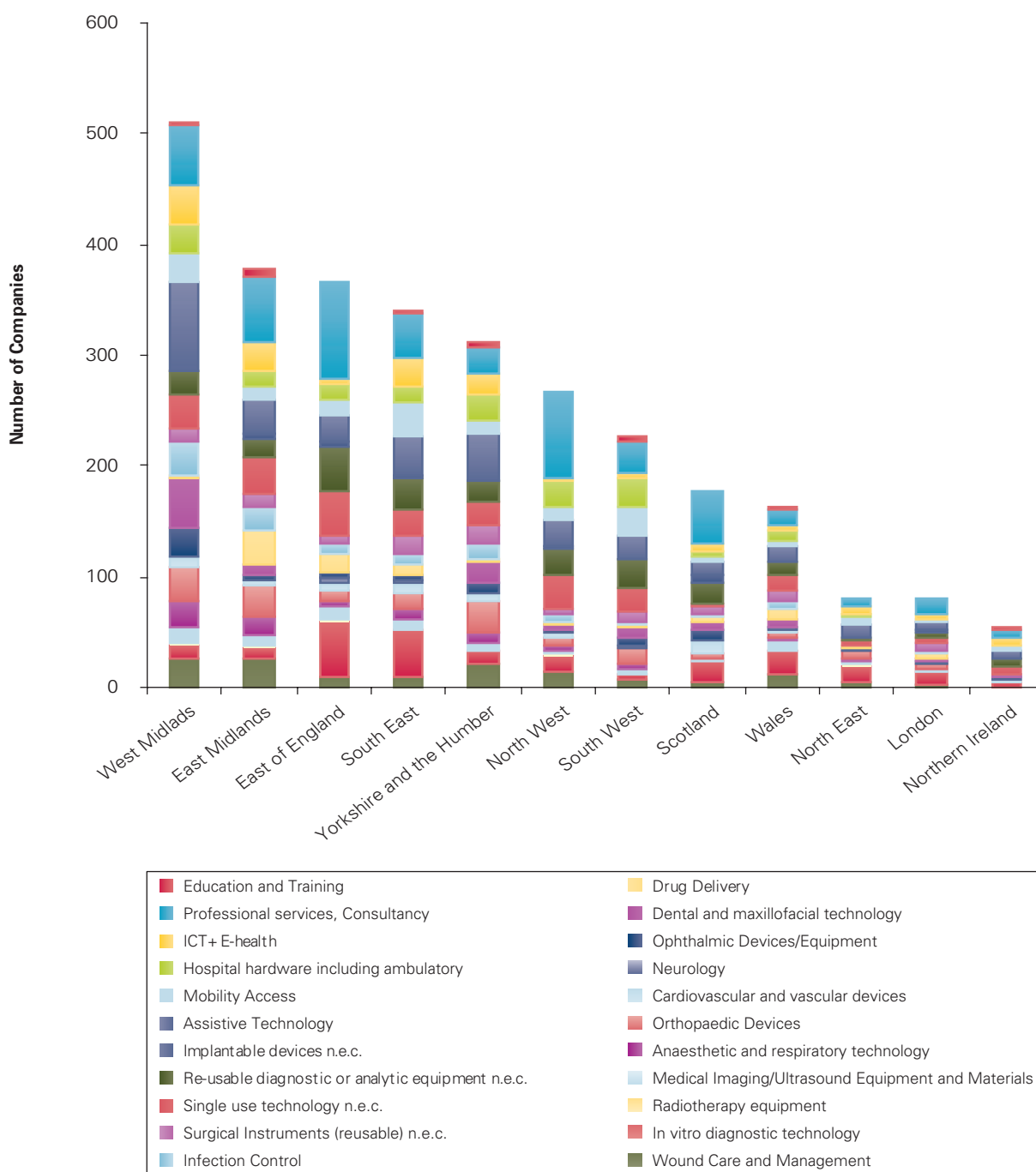
The geographical distribution of company size by turnover is shown in **Figure 12**. Across the UK, all areas have companies in all size ranges and in all areas between 25% and 45% of companies have turnovers in scope of over £1m a year.

Figure 12. Distribution of turnover, employment and companies for the UK medical technology sector



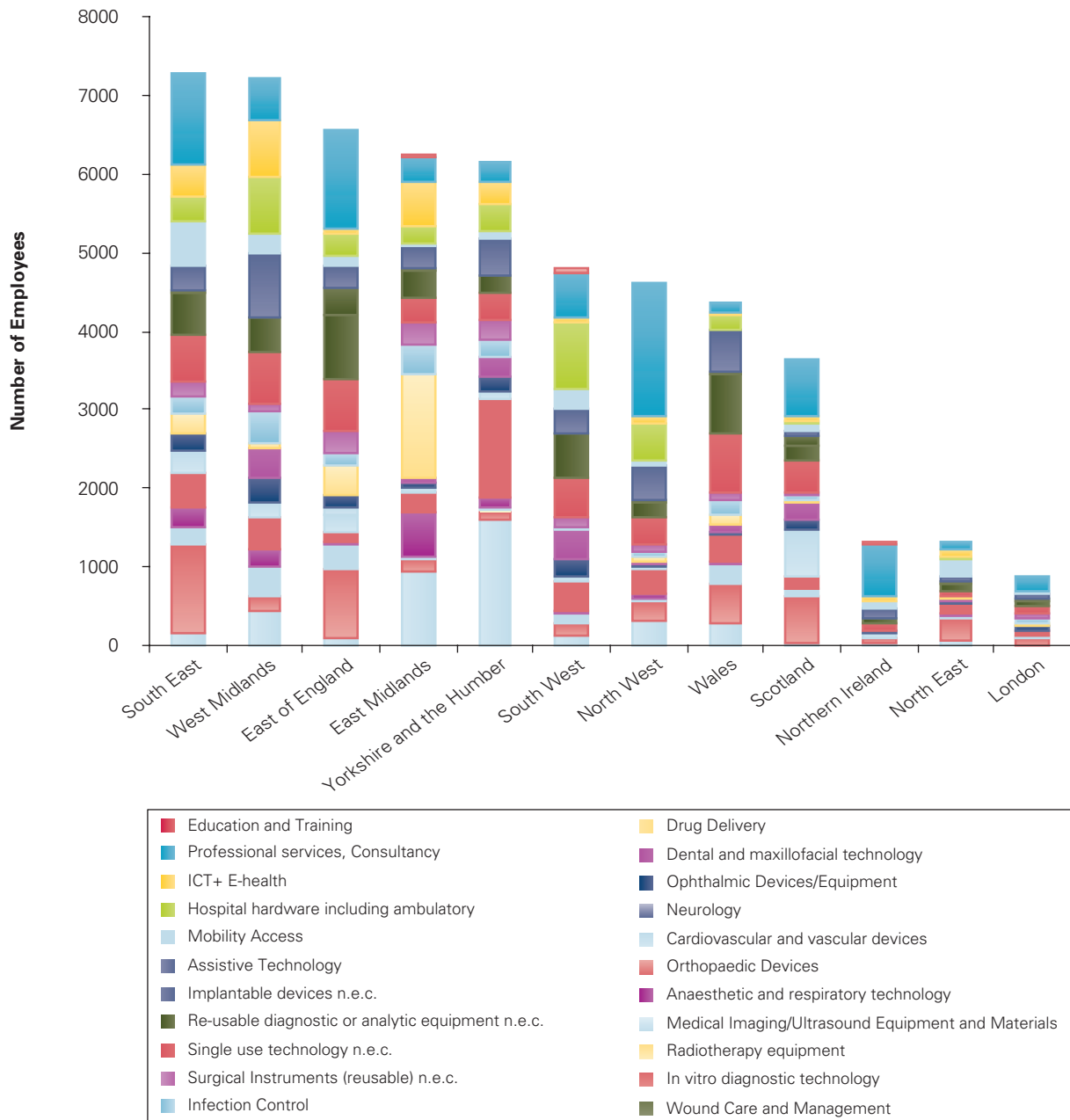
The segmentation methodology enables the identification of activities across the medical technology sector in the UK. **Figure 13** shows that the West Midlands contains the most companies, followed by the East Midlands and then the East of England. This is consistent with the 2009 data. Together these three regions account for 42% of the total medical technology companies within the UK. This percentage share has not changed since 2009. Most areas in the UK have companies active in all segments. The West Midlands has the highest number of assistive technology companies and together with the East of England and South East England have a high number of the UK's in-vitro diagnostic companies.

Figure 13. Number of medical technology companies per segment



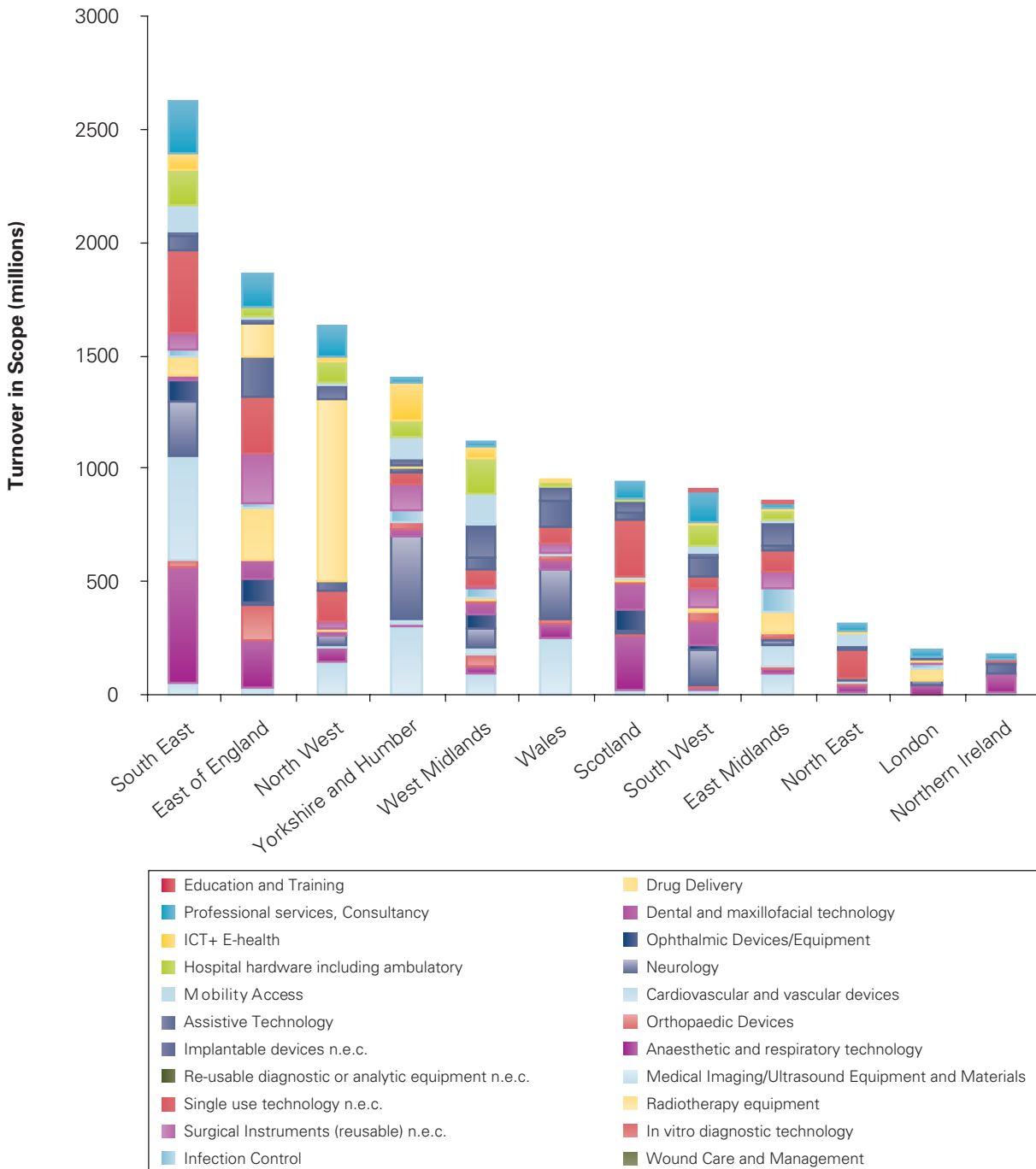
The employment pattern across these companies (detailed in **Figure 14**) shows that the highest employment numbers in the medical technology sector are in the South East of England, followed by the West Midlands and the East of England. Companies in the South East employ 13% of the UK wide medical technology workforce, the top three regions account for 39% of the total employment in this sector.

Figure 14. Total number of employees in medical technology companies per segment



Mapping the total turnover shows a different ordering. **Figure 15** shows that companies based in the South East and East of England have the highest turnovers, representing 35% of the total UK turnover, a distribution that is consistent with 2009.

Figure 15. Total Turnover per medical technology segment by UK region

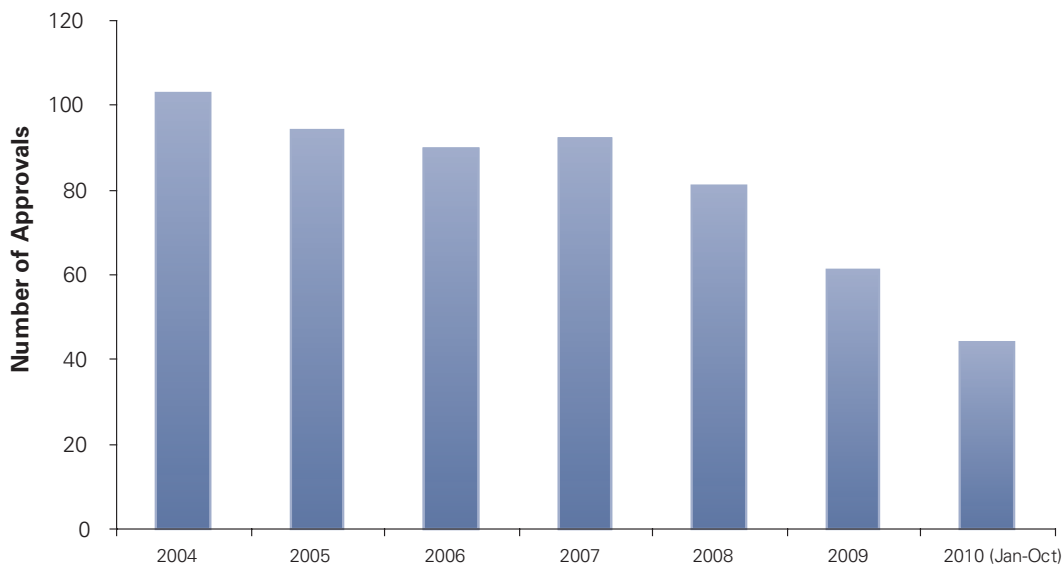


2.6. Medical Technology Pipeline and Sector Investment

The medical technology industry is characterised by a high rate of product innovation and short life-cycles for some segments. One 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 world's largest medical technology market, the USA.

The BioPharm Insight²⁸ database shows that for UK companies, forty-four devices received approval between January and October 2010 (**Figure 16**). This is consistent with numbers in the same period in 2009. Between 2009 and October 2010 there have been a total of 105 devices approved. Between 2004 and 2008 the numbers of approvals were consistently around 80-100 per annum. The trend since 2008 is for approvals per annum to decrease, and a pro-rating of the year-to-date 2010 data is consistent with this trend.

Figure 16. Number of Medical Devices for UK companies gaining approval in the USA



Medical technology has not always attracted the same level of investments as the medical biotechnology sector. In recent years this has been changing with venture funds investing more readily into medical technology companies due to an apparent change in the attitude of investors attracted by the high growth rates, and shorter and less risky approval routes within the sector. However, recent investment trends show that this period of increased investment is slowing. Figures in 2008, from Ernst and Young Global biotechnology report 2010, showed a decrease in venture capital financing of 19.5% and this downward trend has continued into 2009 where there has been a further drop of 17%²⁹. It should be noted that this trend was not consistently seen throughout Europe. In Switzerland an increase in venture funding of 57% was seen in 2009³⁰.

2.7. Trade

The UK market for medical technology and supplies is estimated to be £5.3bn³¹. Espicom estimates that the real annual growth over the next five years to be 3.6% in dollar terms³², equal to only 1.6% in terms of local currency. This will take the overall market to just under £6.3bn by 2015.

In local currency terms, UK exports of medical technology generally performed well in 2009, although this translated to sharp falls when viewed in Euros or US dollars³³. Performance since the end of 2009 has markedly improved however, with exports for the first two months of 2010 up 23.4% in US\$ terms³⁴. The trend has been sharply downward since the latter part of 2008, especially when viewed in Euros or US\$. This has continued in 2009-2010, with imports falling from just under £5bn to £3.4bn³⁵.

28 BioPharm Insight 2010

29 Ernst and Young Global biotechnology report 2010

30 Ernst and Young Global biotechnology report 2010

31 Med Tech Storyboard, Espicom 2010

32 Med Tech Storyboard, Espicom 2010

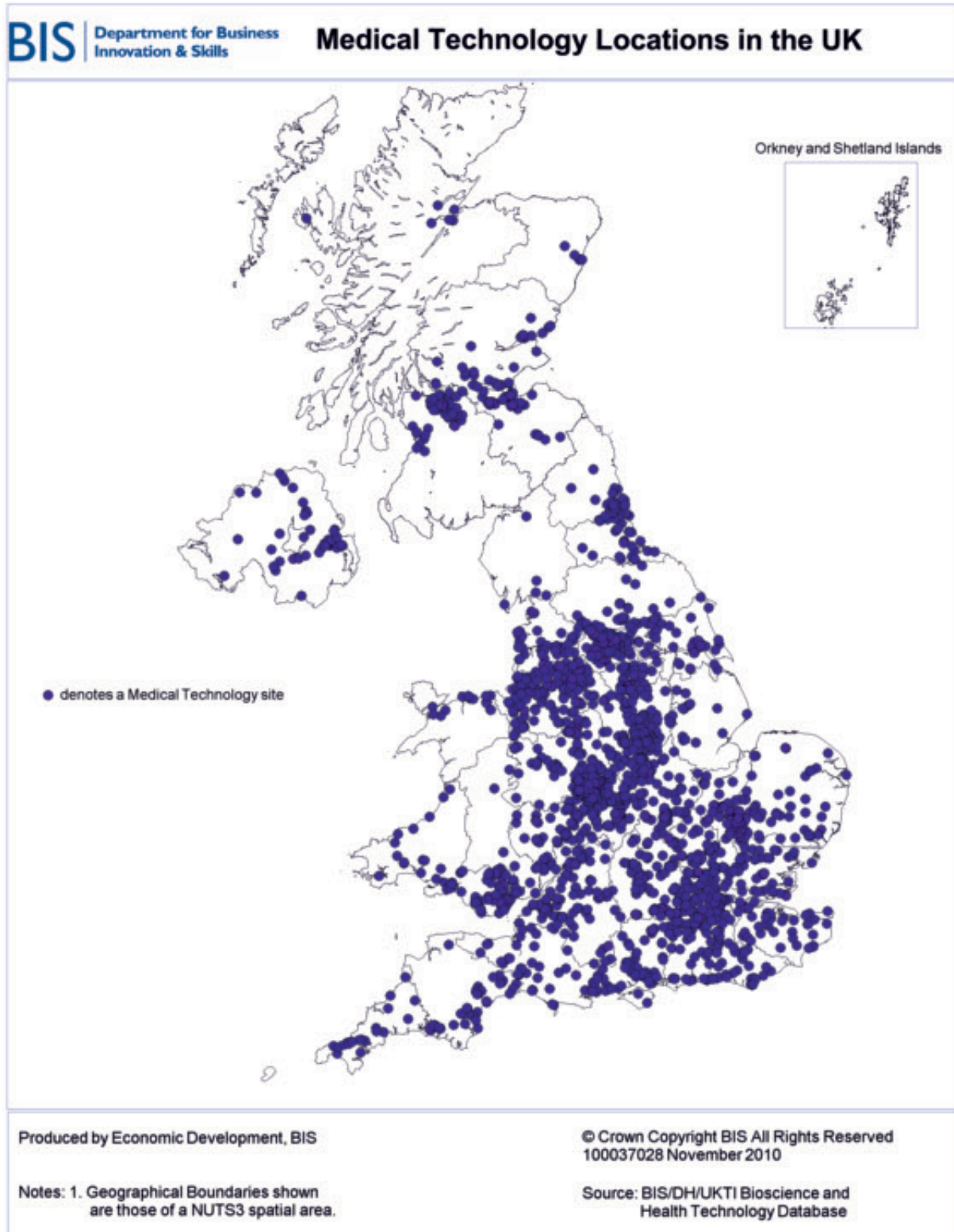
33 Med Tech Storyboard, Espicom 2010

34 Med Tech Storyboard, Espicom 2010

35 Med Tech Storyboard, Espicom 2010

2.8. Geographical Distribution of Medical Technology Companies:

Map 1 Geographical Distribution of medical technology companies



UK medical technology industry – profile

- A total of 3,034 companies with a combined in-scope turnover of £13.1bn. This is a 4% rise in turnover from last year.
- Total number of employees is 55,625. This is a 3% rise from last year.
- 25% of companies investing in R&D.
- 44% of companies are involved in manufacturing.
- 99% of companies have less than 250 employees.
- 93% have turnovers in the range of £100k to £5m per annum.
- The UK is home to 425 companies with turnovers in excess of £5m per annum.
- 56% of all companies are over 10 years old.
- Exports for the first two months of 2010 up 23.4%.

Top three segments in the sector		
Turnover	Employment	No. of Companies
Single Use Technology	Professional services	Professional services
In-vitro diagnostics	Single use technology	Assistive technology
Orthopaedic Devices	Re-usable diagnostic	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;
- that offer specialised, sector specific services to biopharmaceutical companies such as regulatory or legal advice, contract manufacturing or research services;
- SMEs involved in the discovery and development of chemical “Small Molecules.”

The activities of large pharmaceutical companies in the development and manufacture of small molecules are excluded from the scope. However, the divisions of large (non-SME) pharmaceutical companies that develop or manufacture medical biotechnology products are included where data on these is available and separately identifiable.

The medical biotechnology sector in the database has been divided into seven segments based on the products or services they develop or offer (see Appendix III). The database allows companies to be classified as being active in more than one of these segments. In the analysis presented here, companies have been analysed by their primary activity from which the majority of turnover and employment is derived.

There are six product segments and a specialist service segment. The six former segments are classified according to the technology employed rather than the condition treated, for example companies that develop, manufacture or sell medicines based on antibodies and small molecules. Companies have also been classified according to the traditional therapeutic categories, although the majority of the analysis presented is based on technology employed.

3.2. Sector Overview

In 2010 the UK medical biotechnology sector contains 942 companies with a combined turnover of £5.5bn employing 36,700 people. This includes 345 or 37% of the sector companies that have at least one major activity in the development, manufacturing or selling of therapeutic products. There are also 40 companies (4% of the total) where there was not sufficient publicly available information to allocate them to a level one classification. For these companies involved in therapeutics, 50% use small molecule technology, with the remainder using technologies based on biological material, such as antibodies or proteins. 63% of all companies are specialist service providers such as consultants, material and equipment suppliers and drug development services. This structure of the medical biotechnology sector in the UK indicates a well developed supply chain with a significant number of companies able to outsource non-core activities.

The turnover comparison for the total UK medical biotechnology sector shows an increase of 18% between 2009 and 2010, while the sector employment numbers show a 3% increase over the same period. The number of companies in the total sector has fallen by 4% from 2009 to 2010.

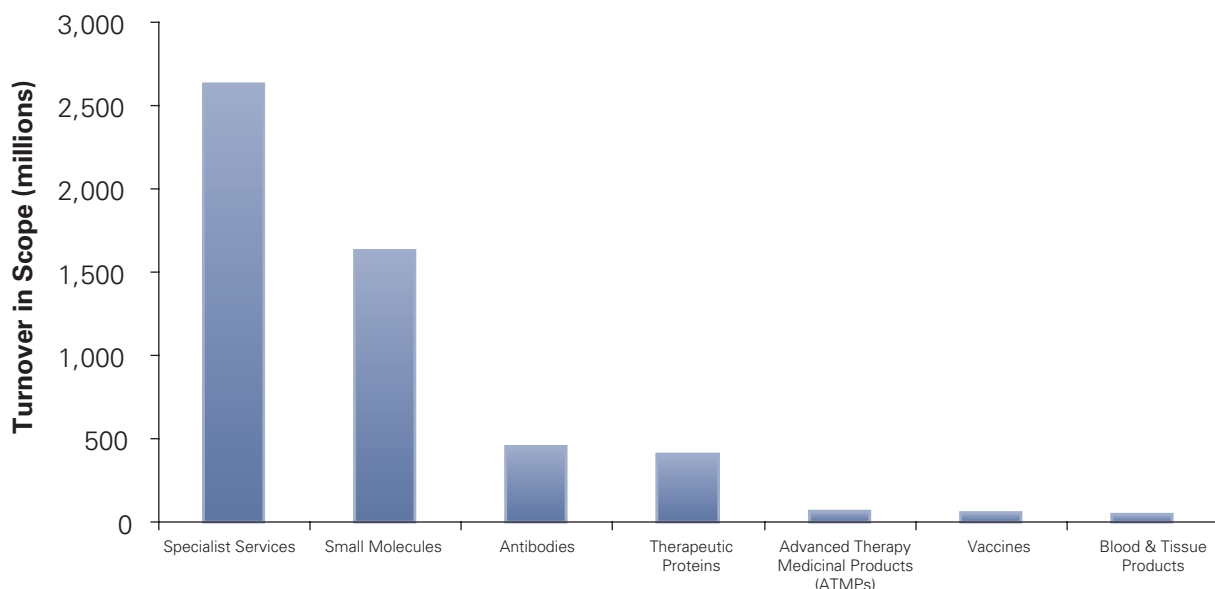
The UK medical biotechnology sector is involved in a wide range of therapeutic areas. However over 50% of all companies are focused on the design of therapies and technologies for central nervous system disorders or oncology.

Medical Biotechnology companies are spread right across the UK although there is a degree of concentration with over half of the total turnover being located in the South East and the East of England.

3.3. Turnover, Employment and Segmentation

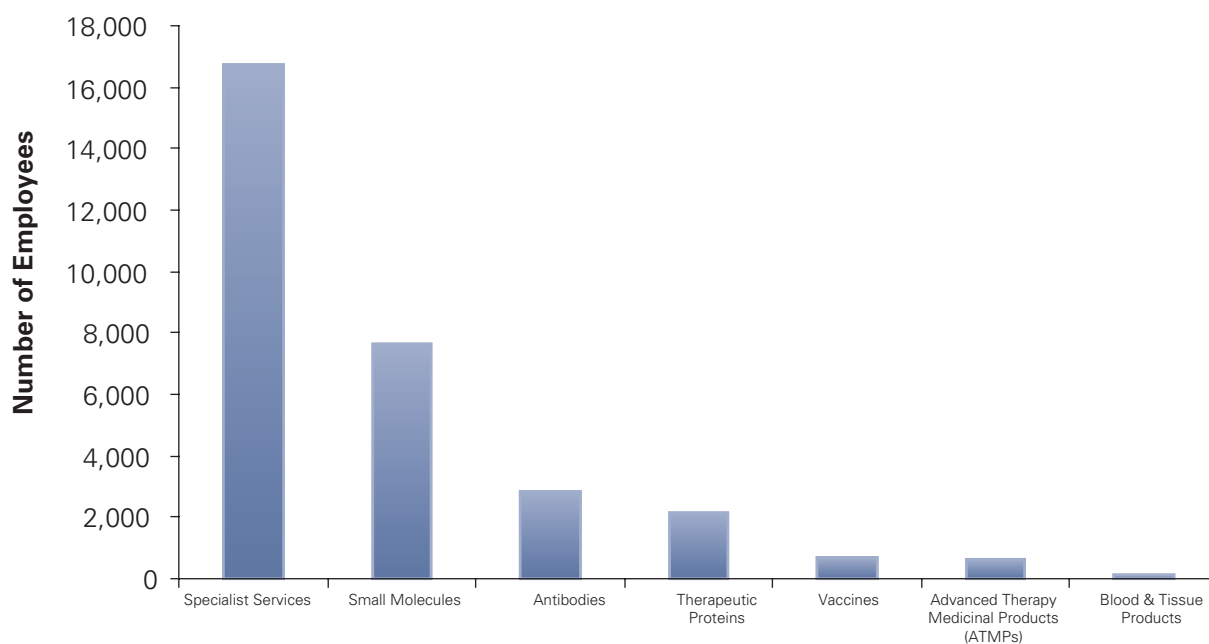
The distribution of the £5.5bn turnover for the medical biotechnology sector by individual segment is shown in **Figure 17**. There are 168 companies in the sector using small molecule technology which is similar to the proportion of those using technology based on biological material (antibodies, therapeutic proteins, advanced therapy medicinal products, gene & cell therapies, vaccines, and blood and tissue products). The largest segment in terms of turnover is the specialist services segment which consists of companies providing regulatory advice, general consultancy and specialist analytical services. For companies involved in developing, manufacturing or marketing final products, the largest segment in terms of turnover is small molecules at £1.6bn. All other segments that are involved in using biological based technologies have a combined turnover of £1bn.

Figure 17. Turnover in UK Medical Biotechnology Companies by Segment



Companies that use small molecule technology employ 7,668 people representing 21% of the sector employment. The pattern of employment by segments in 2010 is the same as 2009, with the majority of employees in the sector working for specialist service providers. This division of employment allows companies developing therapeutic products to concentrate resources on the core activities of research, development and marketing while outsourcing non-core activities to specialists.

Figure 18. *Employees in UK Medical Biotechnology Companies by Segment*



The structure of the medical biotechnology sector is further reflected in the number of companies per segment shown in **Figure 19**. Specialist suppliers dominate with 557 companies, which is 59% of all companies in the sector. Also shown in **Figure 19** is the change in companies per segment between 2009 and 2010, which shows an overall fall of 4%. All segments with the exception of vaccines show a reduction in the number of companies, from a mixture of merger, acquisition or companies that have ceased trading.

Figure 19. Number of UK Medical Biotechnology Companies by Segment

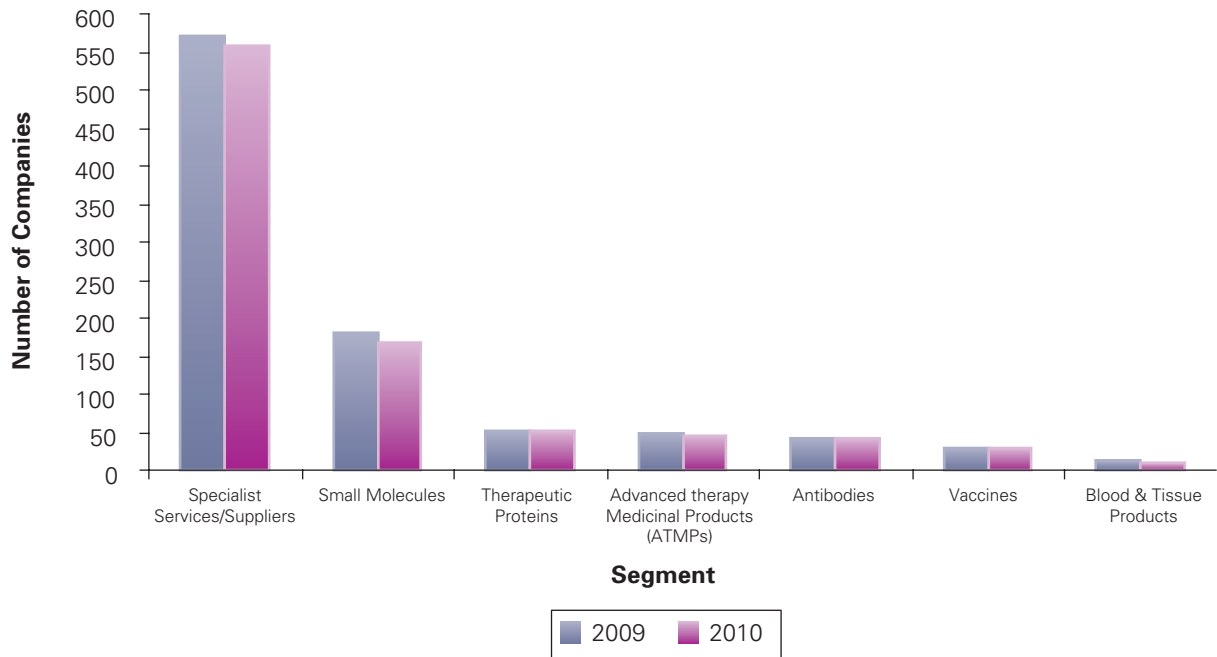
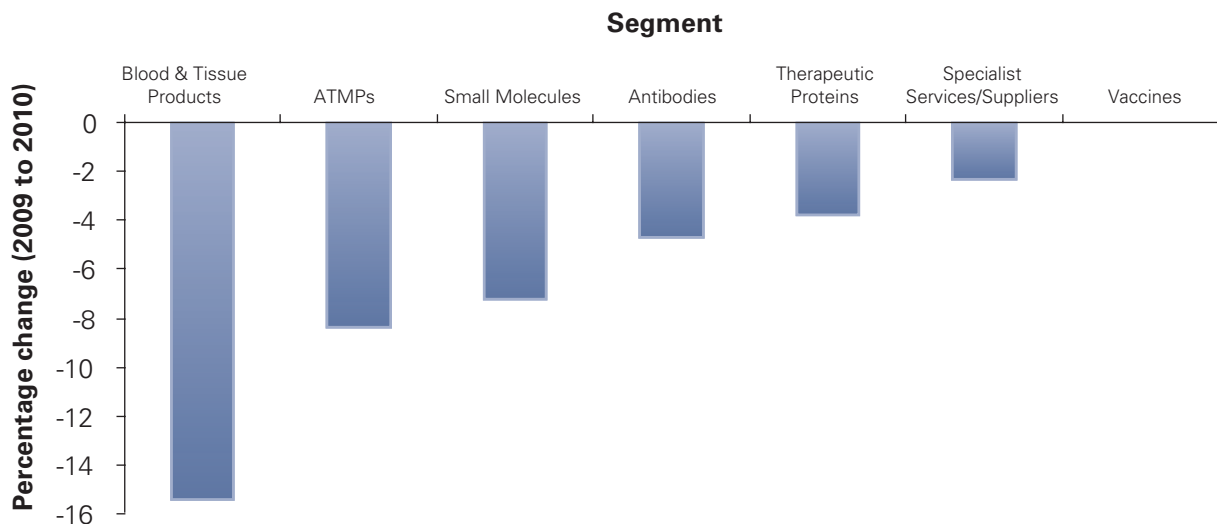


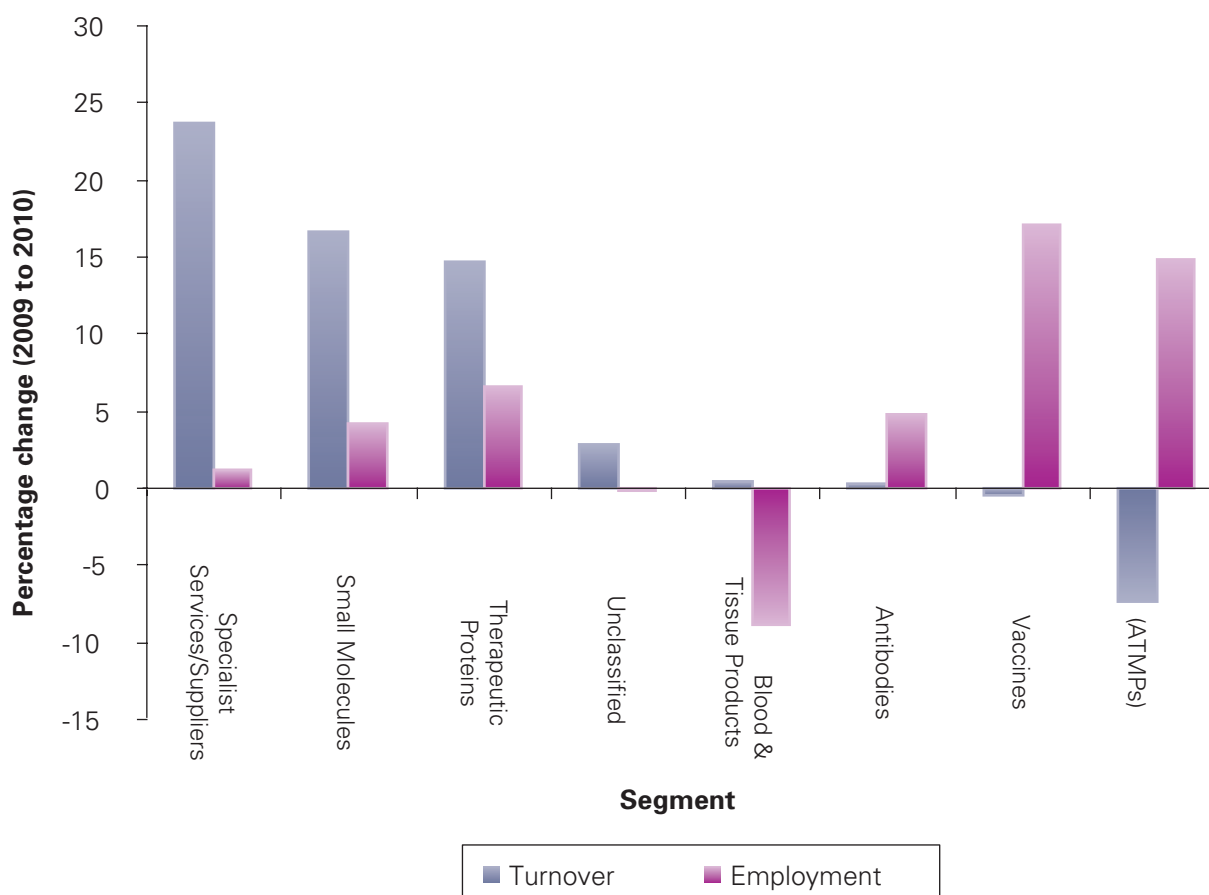
Figure 20 shows the percentage changes from 2009 to 2010 by segment. Although blood and tissue products shows the greatest fall, this only represents an actual fall of two companies, while there has been a reduction of 13 companies in both specialist services and small molecules. The number of advanced therapy medicinal products (ATMP's) companies fell from 48 to 44.

Figure 20. Change in UK Medical Biotechnology Company Numbers by Segment



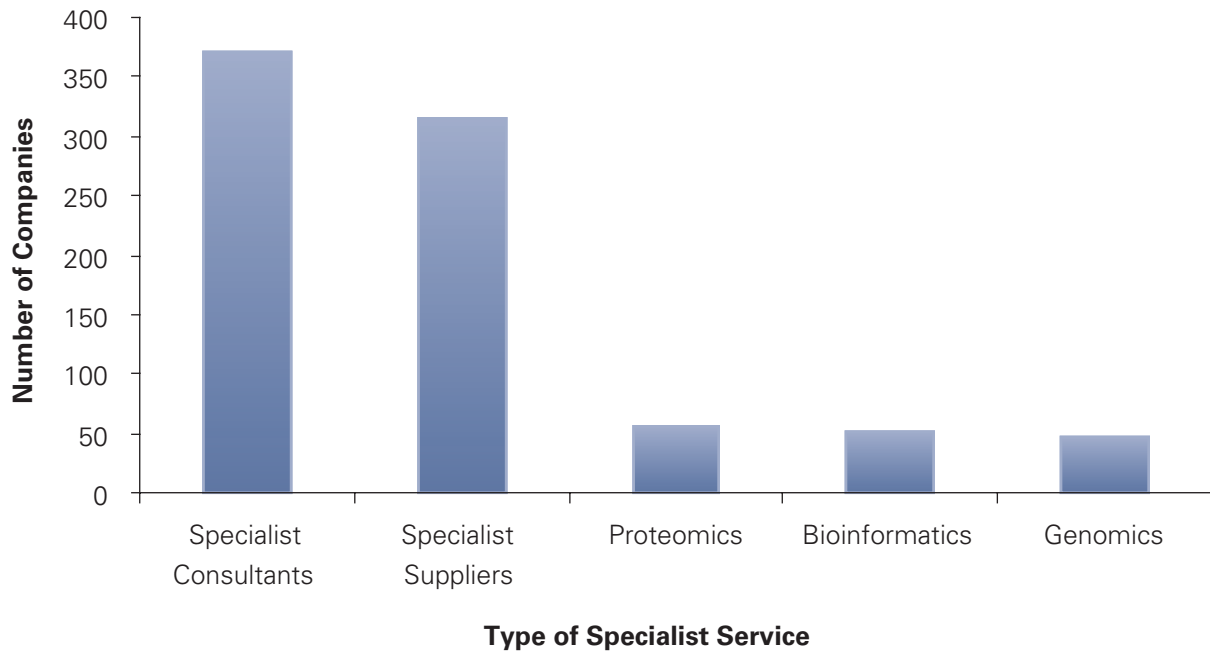
Although the sector has shown a 4% fall in company numbers from 2009 to 2010, sector turnover and employment trends are up 18% and 3% respectively. **Figure 21** shows turnover and employment trends by segment. The data for turnover is based on 363 companies for which data is available for 2009 and 2010. Specialist suppliers, small molecules and therapeutic proteins all show a significant increase in turnover but without a corresponding increase in employment. Antibodies companies and vaccine companies show increases in employment without a significant change in turnover. ATMP companies show an increase in employment but a decrease in turnover.

Figure 21. *Changes to the UK Medical Biotechnology Company Turnover and Employment by Segment*



The specialist service segment is the largest in the sector based on all measures and therefore of significant economic importance. **Figure 22** gives a breakdown of the services being offered by these companies. Specialist consultants are the largest sub-segment with 371 companies offering a whole range of services including intellectual property advice, drug development expertise and Good Manufacturing Practice consultancy. Specialist suppliers are the second largest sub-segment with 314 companies offering a range of equipment, consumables and contract services. Although the remaining three sub-segments are smaller they are still significant in absolute numbers of companies and provide a range of high technology analytical services.

Figure 22. *Distribution of UK Medical Biotechnology Specialist Services Companies by Sub-Segment*



3.4. Company Size and Activity

The UK medical biotechnology sector is dominated by SMEs with 97% of the companies having less than 250 employees. **Figure 23** shows the sector has almost half its companies with less than five employees and 71% with fewer than 20. However, 165 companies have a turnover of £5m or greater and 29 companies have 250 employees or more.

Figure 23. *Distribution of UK Medical Biotechnology Companies by Employees*

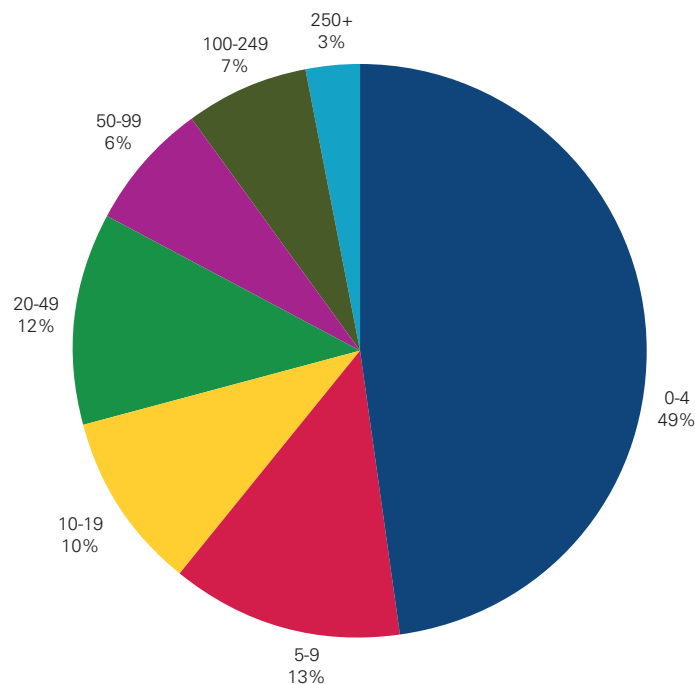


Figure 24 shows the age range of medical biotechnology companies, this shows a healthy mix of young and older companies. 42% of companies are over 10 years old indicating the UK has a sustainable medical biotechnology industry sector. Further analysis of company age by segments shows that the segments showing significantly different age profiles to the average are ATMP companies which are younger and vaccines companies which are older than the average for the sector.

Figure 24. *Distribution of UK Medical Biotechnology Companies by Age*

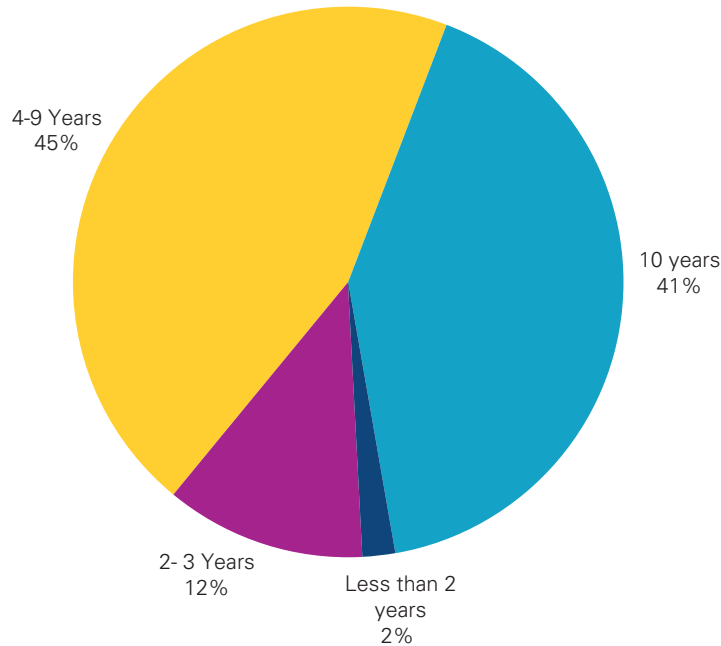
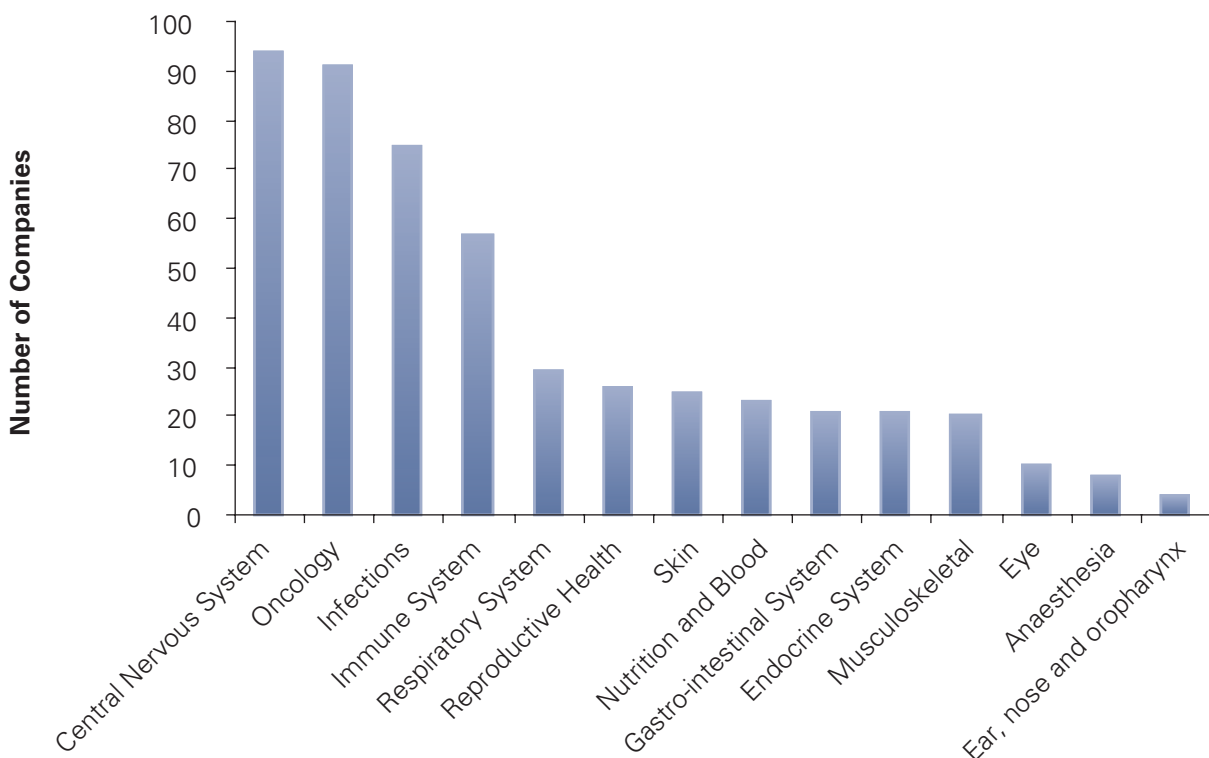


Figure 25 shows, for those companies where information is available, the main therapeutic category they are targeting. Central nervous system and oncology medicines are the top two therapeutic categories with over 90 companies together representing 52% of the total. Other common indications being addressed are infections and the immune system. Most of the other Therapeutic Areas are being addressed by between 20 and 30 companies.

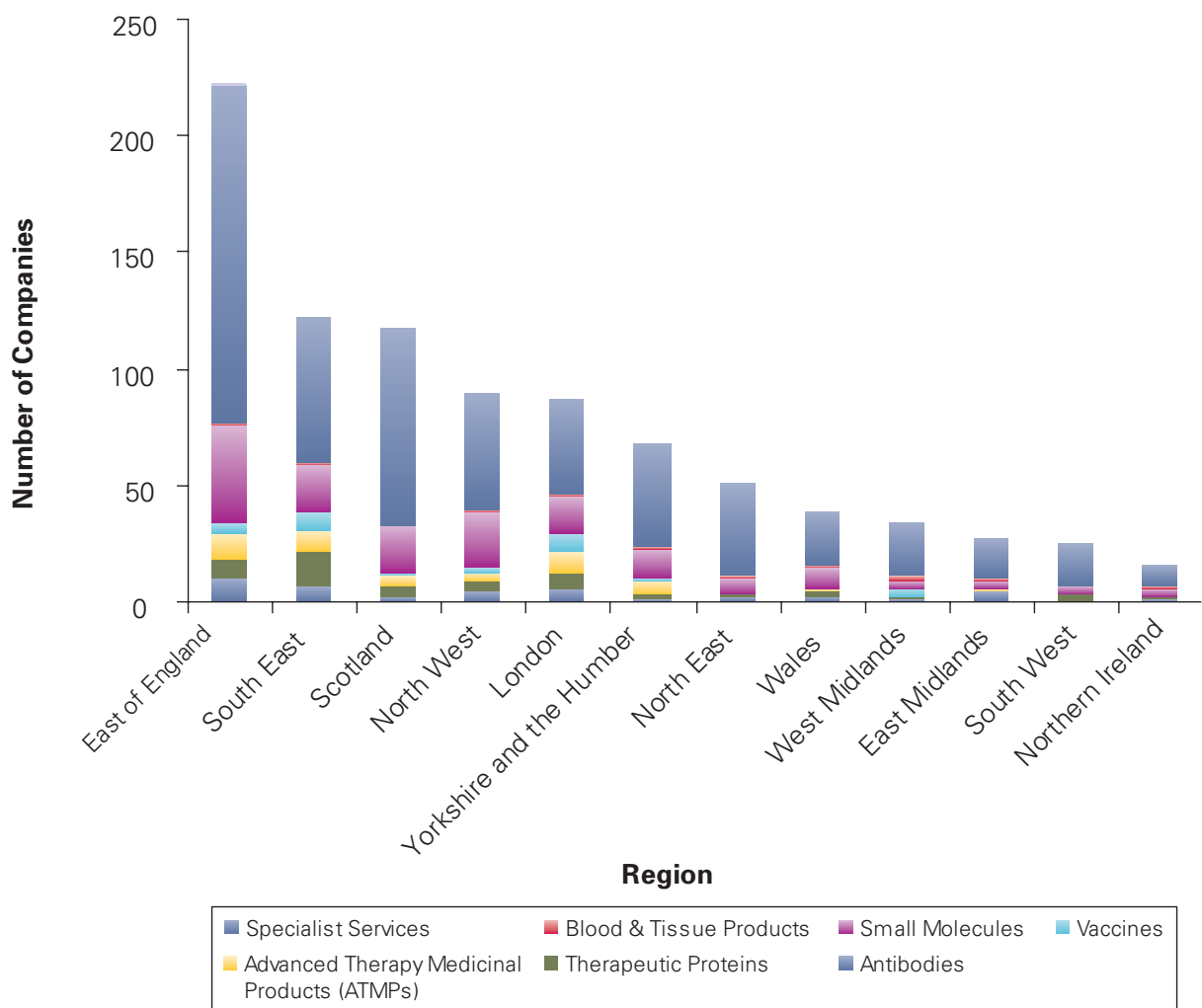
Figure 25. *Distribution of UK Medical Biotechnology Companies by Therapeutic Area*



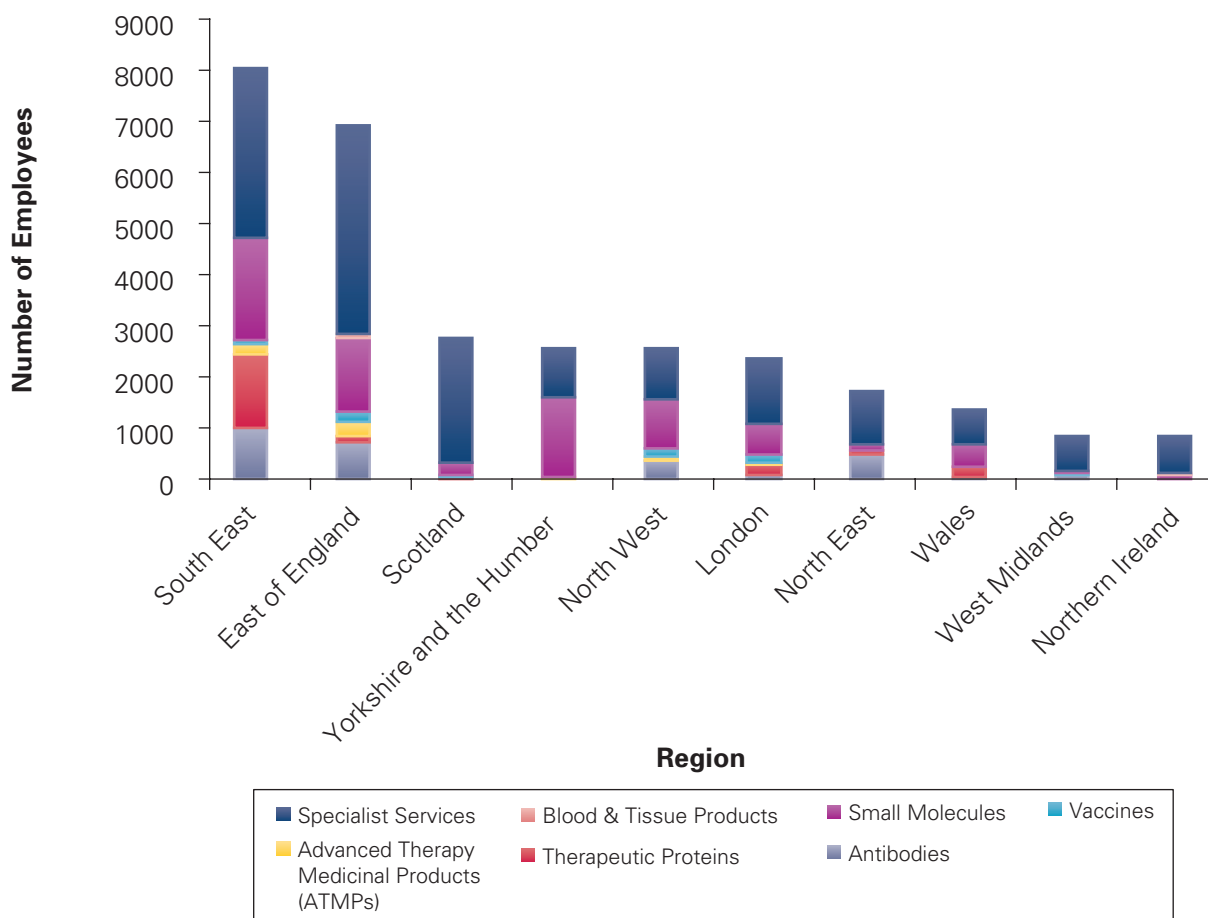
3.5. UK Profile

Figures 26, 27 & 28 shows the distribution of medical biotechnology economic activity across the UK expressed by the location of the number of companies, turnover and employment by segment. The East of England has approximately a quarter of all economic activity with 27% of total turnover, 24% of the employees and 24% of the total number of companies in the sector. The East of England combined with the South East dominates the medical biotechnology sector in the UK with 53% of the total turnover, 45% of total employees and 38% of the total companies. The data suggests that the cluster in these two regions is more mature, especially in the South East. This latter area has 14% of the total number of companies and 26% of the total turnover, indicating a number of larger companies within the cluster.

Figure 26. Number of Companies in the UK Medical Biotechnology Sector by Segment

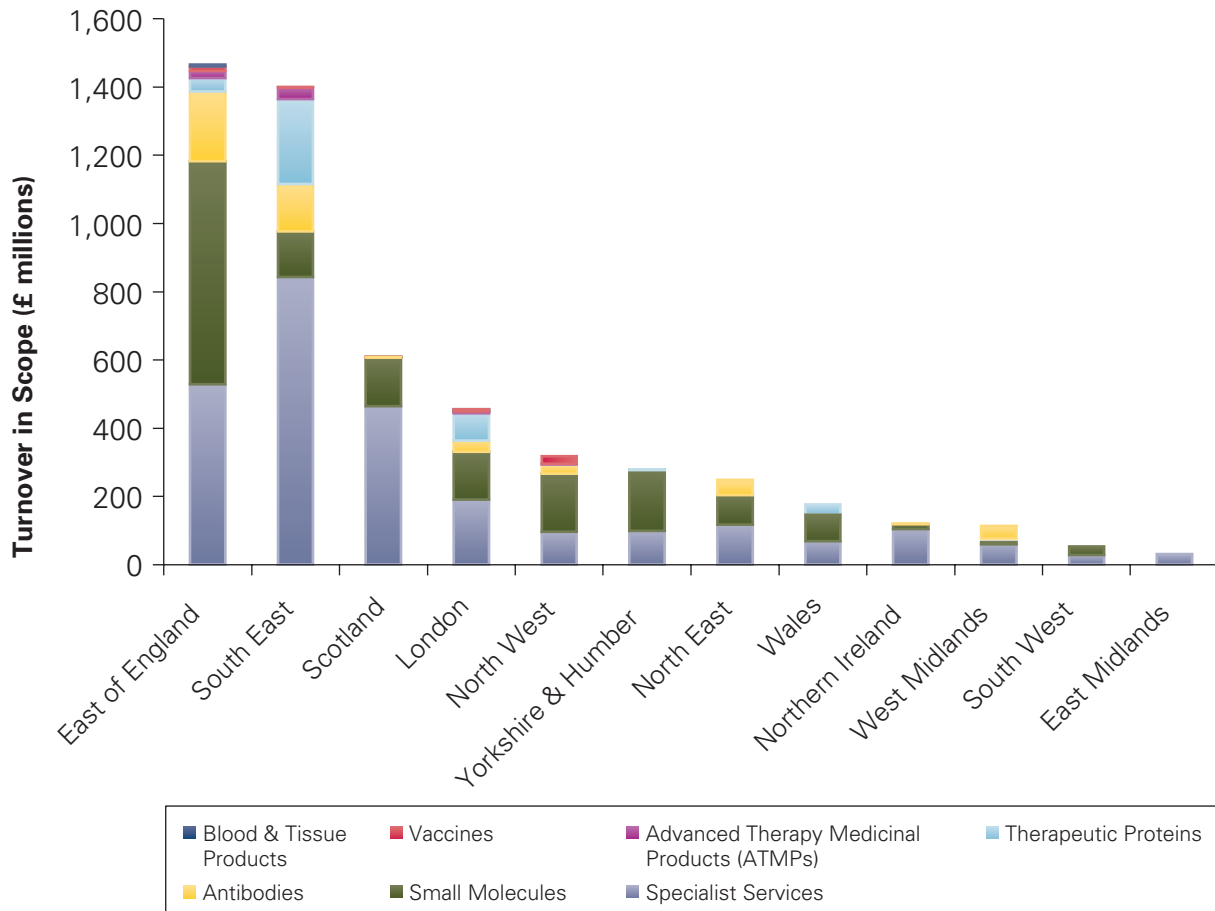


Scotland and the West Midlands are the only regions to register a slight increase in company numbers between 2009 and 2010. A third of the companies in London and the South East are primarily concerned with biopharmaceuticals, a higher proportion than other regions.

Figure 27. *Employees in the UK Medical Biotechnology Sector by Segment*

All areas of the UK where there is significant medical biotechnology sector activity have large numbers of companies in the specialist services segment. This is the normal structure of biotechnology clusters. The structure in Scotland is unusual in that it is dominated by the specialist services segment as shown in **Figure 28**. This is due to the large number of contract research organisations (CROs) and bio-analytical testing companies in Scotland.

Figure 28. Turnover in the UK Medical Biotechnology Sector by Segment

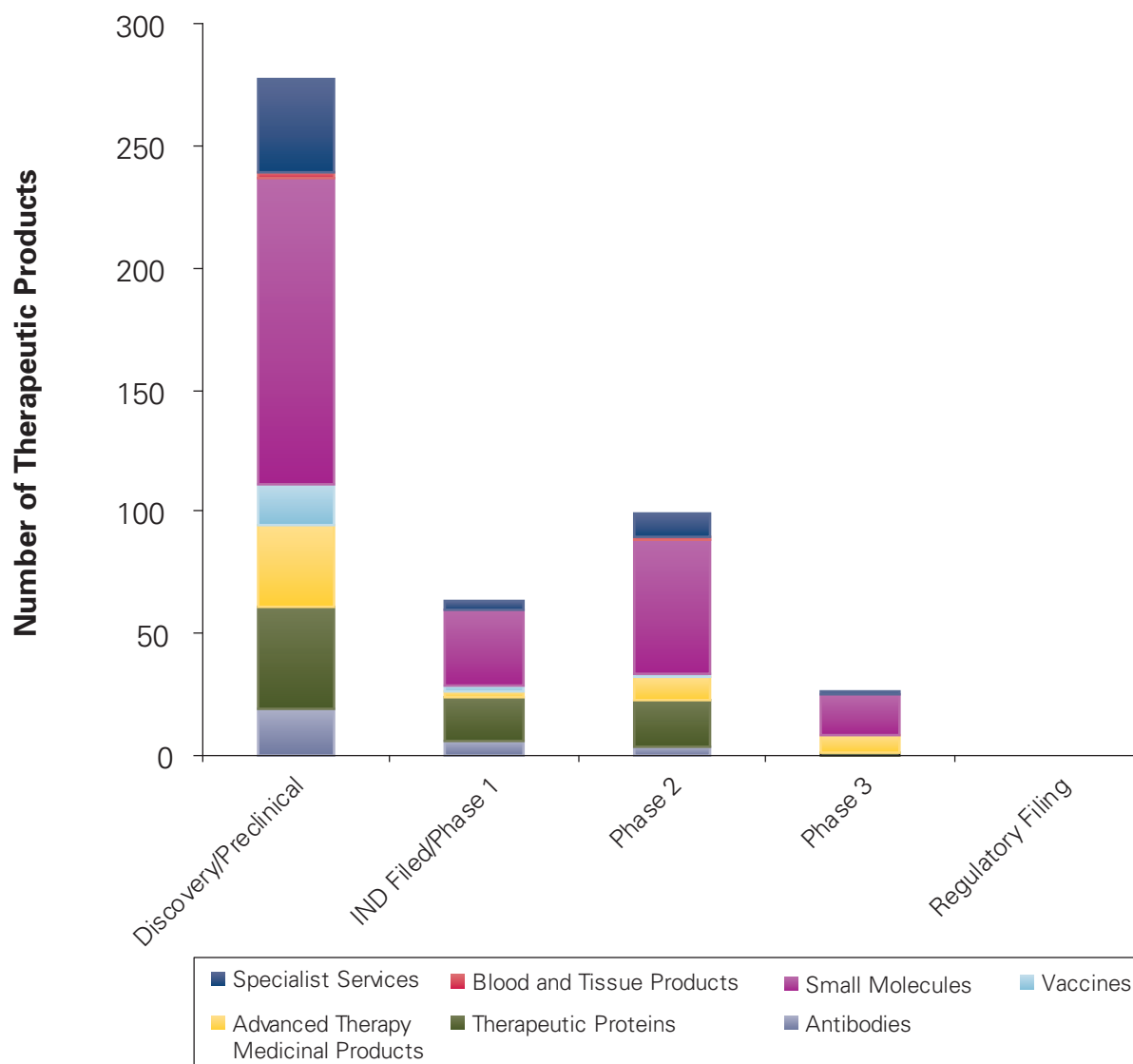


3.6 Medical Biotechnology Pipeline

The health of the medical biotechnology sector is often measured by the pipeline of products in development, particularly those that are in human trials. The 2010 report by Ernst and Young³⁶ detailed that the total number of drugs in clinical development in Europe showed a 16% growth which is similar to the growth witnessed over the last few years. The UK continued to take the lead, accounting for 20% of the total products in clinical development in Europe³⁷.

The BioPharm Insight³⁸ database, cross referenced with companies in the database, produced a snap-shot of the pipeline which is shown in **Figure 29**. The total number of products in development is 465, the majority of which are small molecule drugs. This is similar to the analysis undertaken in 2009. The total number of antibody, protein, vaccines and advanced therapies products (gene therapy, cell therapies etc.) in development is 182. These segments represent products developed using the most advanced of the biotechnologies.

36 Ernst and Young, Beyond Borders, Global biotechnology report 2010
 37 Ernst and Young, Beyond Borders, Global biotechnology report 2010
 38 BioPharm Insight, 2010

Figure 29. UK Medical Biotechnology Pipeline

3.7 Sector Investment

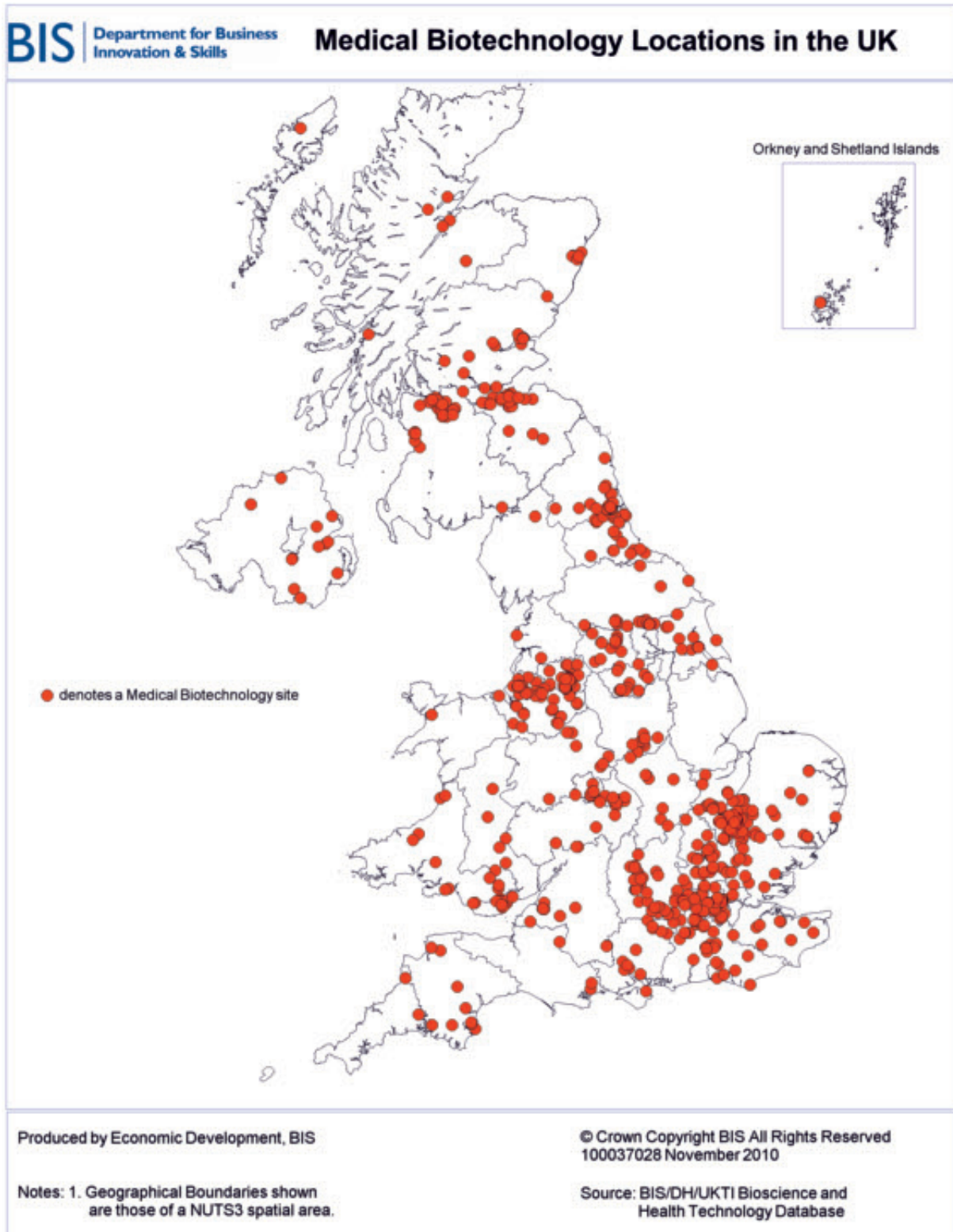
The investment community has historically seen biotechnology as having high potential to generate significant return on investment. In 2009 the total investment into all European biotechnology sectors, of which medical is the largest, from all the financing sources reached €2.8bn³⁹. The UK had the largest number of individual financings in Europe and was second only to Switzerland in the total amount of venture capital raised⁴⁰.

39 Ernst and Young, Beyond Borders, Global biotechnology report 2010

40 Ernst and Young, Beyond Borders, Global biotechnology report 2010

3.8 Geographical Distribution of medical biotechnology companies

Map 2 Geographical Distribution of medical biotechnology companies



UK Medical Biotechnology industry – Profile

- A total of 942 companies with a combined turnover of £5.5 billion.
- Total number of employees is 36,700.
- 345 companies directly involved in therapeutic development and manufacture.
- 557 companies in the sector supply chain.
- The sector saw a rise in turnover of 18% from 2009 to 2010.
- The sector contains 165 companies with a turnover of more than £5m.
- 52% of therapeutic companies are focused on central nervous system disorders or oncology.

Top three segments in the sector		
Turnover	Employment	No. of Companies
Specialist Services	Specialist Services	Specialist Services
Small molecules	Small molecules	Small molecules
Antibodies	Antibodies	Therapeutic Proteins

Industrial Biotechnology Sector

4.1. Sector Definition

This sector contains companies whose prime business activity and turnover is derived directly from the development, manufacture and selling of products and services that use or contain biological material as catalysts or feedstocks to make industrial products. This definition is based around the technology or process involved in the production of the final product that makes up the majority of a company's turnover. Therefore, the database focuses on those companies in the value chain that develop the key technologies that underpin the developing industrial bioeconomy.

Other technologies used by companies include: down stream processing (product purification and separation); technologies derived from plants; technologies using biomass and non-healthcare analytics.

The definition of the sector used in the database, therefore excludes the majority of the economic activity associated with the increasing use of industrial biotechnology to make existing industrial products where the manufacturer's major final products do not contain any biological material. The analogy of this sector definition in the chemical industry is companies that make the catalysts for petrochemical production are included but not companies that sell petrol.

The segmentation approach classifies companies according to the industrial sector which constitutes the major turnover for their products or technology. Captured by this approach are companies developing enzymes, applying enzymes in biotransformation, developing whole cell catalysts and applying these in fermentation systems.

As well as technologies and applications, data has been collected on companies according to business model employed split into R&D, manufacturing, supply chain and sales.

Companies using biotechnology related to the development of crops with properties enhanced for bioprocessing or companies utilising the products of industrial bioprocessing or companies utilising marine bio-resource are not included in the database.

4.2. Sector Overview

The UK industrial biotechnology sector as defined consists of 55 companies with a turnover of £308m and employing 1083 people. Industrial biotechnology is an emerging sector. Robust estimates of the UK industrial biotechnology market by 2025 range from £4bn to £12bn indicating the potential of this sector⁴¹. The integration of industrial biotechnology into mainstream industrial production has the potential to contribute to the UK economy's productivity, environmental and low carbon targets over the next 20 years.

41 IB 2025 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

Four segments (specialist services, fine and speciality chemicals, food & drink and biofuels) together make up the majority of the sector (96%) with specialist services dominating at 50% of the total sector turnover. Many of the companies in this segment are carrying out contract R&D and manufacturing services. The same four segments, together with environmental, dominate the sector by number of companies and employees.

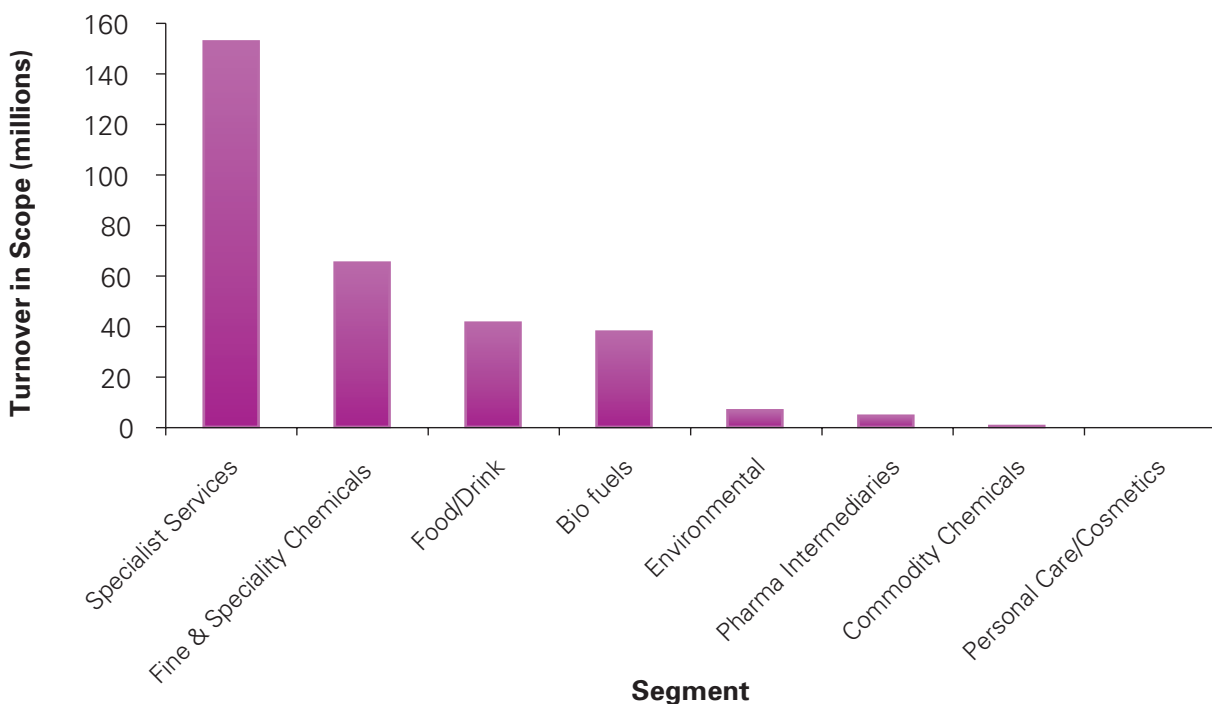
There was a 16% rise in employment numbers to 1083 in 2010, mainly in the biofuels and specialist services segments. The sector turnover comparison shows a decrease of 2% from 2009.

The sector is dominated by SMEs with 50% over 10 years old and 36% between four and nine years old. A high proportion of all the industrial biotechnology companies identified have manufacturing activities (51%) and 67% are engaged in R&D.

4.3. Turnover, Employment and Segmentation

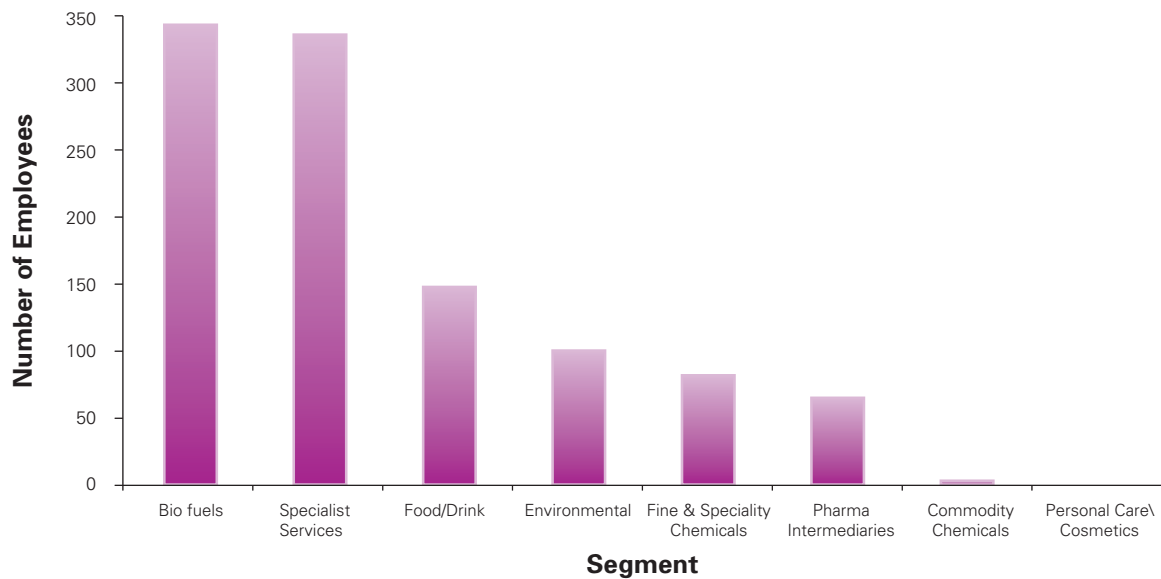
The total sector turnover of £308m is dominated by specialist services companies which contribute 50% of the total. This segment contains companies offering contract R&D and manufacturing services both to companies captured in the database but also to larger companies who are exploring or developing in-house process for existing products. Four segments (specialist services, fine and speciality chemicals, food & drink and biofuels) together make up 96% of the sector turnover.

Figure 30. UK Industrial Biotechnology Sector Turnover by Segment



The total number of people employed in the sector in 2010 was 1083, a 6% increase from 2009. However, this may not be statistically significant given the number of companies used in the analysis. **Figure 31** shows the distribution of employment by segment and highlights the importance of specialist services and biofuels which together account for 63% of all sector employment. These figures do not capture the total employment in the UK industry that is involved in applying the technology. It does not account for in-house research or manufacturing using industrial biotechnology where this accounts for a minor proportion of a company's activity.

Figure 31. *Employees by Segment for the UK Industrial Biotechnology Sector*



The distribution of companies by segment shows a similar concentration in specialist services and biofuels. The biofuels segment shows the highest number of employees and the second highest number of companies. This can be explained by the mixture of small biofuels companies and a few large industrial scale biofuel operations with significant employment.

Figure 32. *Companies by Segment in the UK Industrial Biotechnology Sector*

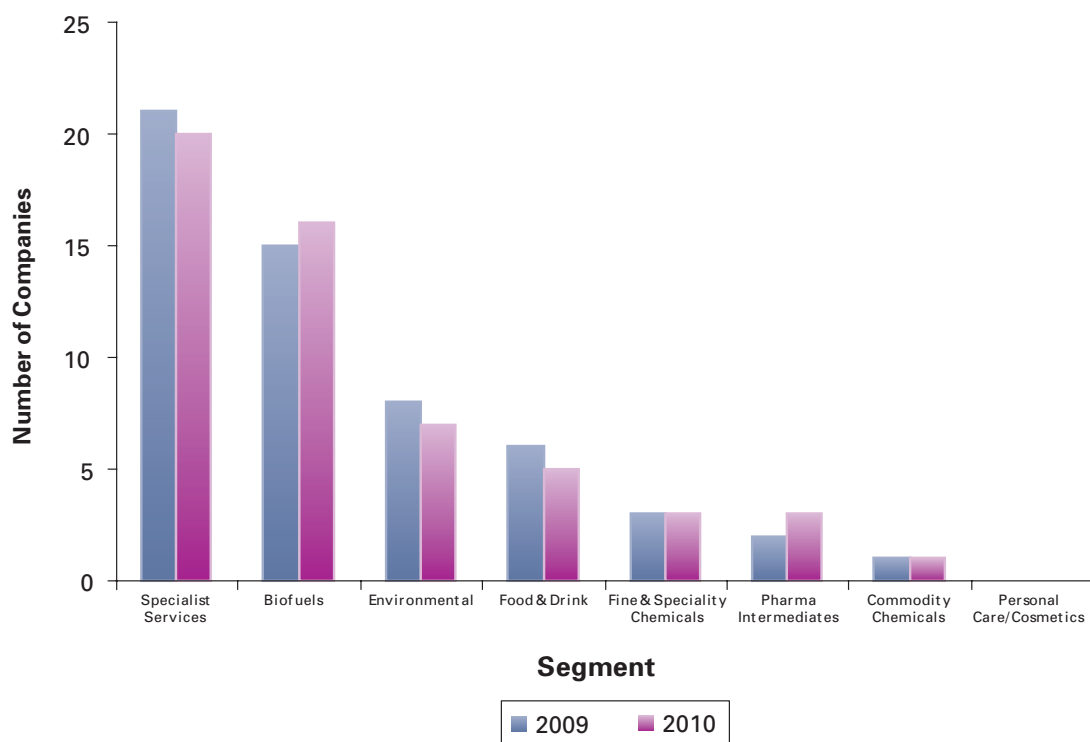
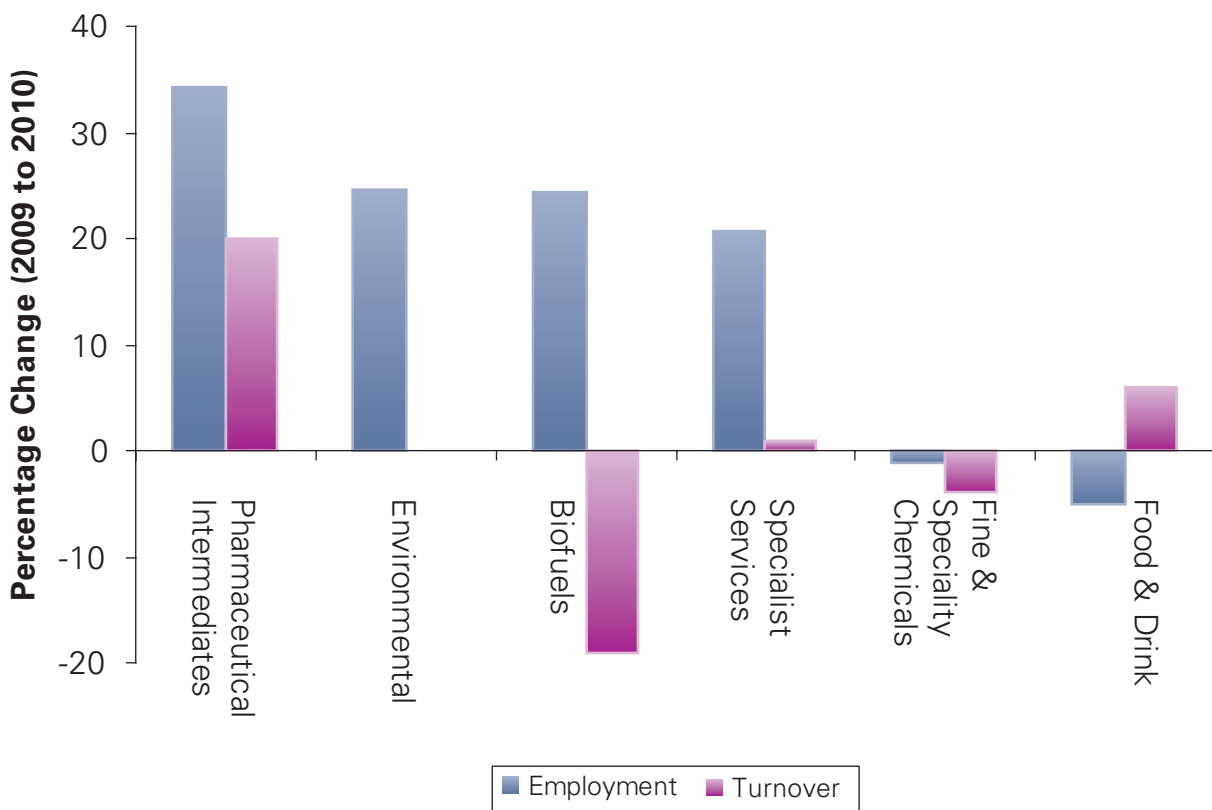


Figure 33 shows the sector employment and turnover comparison between 2009 and 2010. The turnover data is derived from a subset of the companies where there is data available for both years. Due to the low number of companies with data for both years, the only reliable comparisons are for biofuels and specialist services. These two segments show different performances over the year with biofuels showing a 19% decrease and specialist services a 1% increase.

For employment data, information is based on the majority of the 55 companies. No segment has undergone a major reduction in employment but pharmaceutical intermediates, environmental, biofuels and specialist services all show significant increases with an average rise of 23%. A total of 14 companies showed a rise in employment levels, with the largest employment rises in the biofuels and specialist services segments.

Figure 33. *Changes to Employment and Turnover in the UK Industrial Biotechnology Sector 2009 to 2010*



4.4. Company Size and Activity

The majority of the companies in the sector have less than 250 employees and are classified as SMEs. As this analysis is only comparing one year of additional data, no significant change is seen from 2009. The sector is predominantly populated by established companies with 86% of the companies being four years or older. This shows that the technologies have been used for sometime in niche areas of industrial processing.

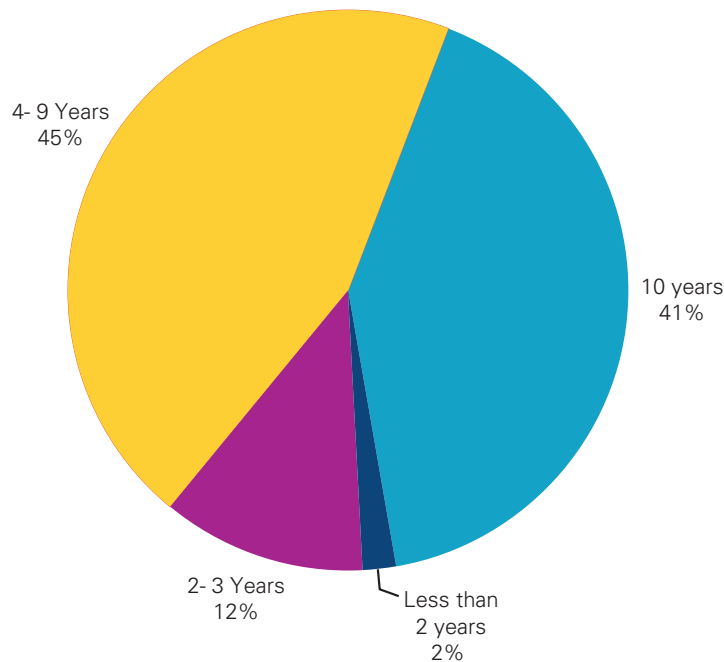
Figure 34. Profile of the UK Industrial Biotechnology Sector by Age

Table 1 shows in more detail the 55 companies within the each segment by the specific technology or technologies they are applying to their products or services and also by the functions they carry out within the company. For example, in the specialist services segments, the technology that is most frequently used by the 20 companies is enzyme development followed by fermentation. In this example a number of companies will be offering to their customers a service to develop a specific enzyme to meet their processing or product needs, such as an enzyme to carry out a specific chemical conversion or an enzyme that operates in low temperature detergents. Also, the table shows that specialist service suppliers most frequently offer research and development services. The make up of the biofuel segment is different in that the most frequent employed technology is fermentation, which is also the most commonly employed technology throughout the whole sector, probably because it is the most mature technology.

Most of the companies are undertaking R&D activities and many have manufacturing operations. This suggests there is a healthy infrastructure of companies developing in the UK, able to support the value chain with the core biocatalytic technologies it needs.

In contrast, further down the value chain, there are fewer companies using these technologies to make chemicals of various types. The exception is biofuels where there have been specific interventions to incentivise the industry. A World Economic Forum report (2010)⁴² has stated that “all biofuel-producing countries have a mix of mandates and subsidies in place to support their national biofuel industries” but “in chemicals production, no related subsidies or mandates exist in the industry”.

42 The Future of Industrial Biorefineries, World Economic Forum, 2010

Table 1 The frequency of technology applied or utilized and business activity for UK Industrial Biotechnology companies

Primary Application	Technology									Business Activity				
	Number of Companies	Biomass	Plant	Whole Cell Development	Fermentation	DSP	Enzyme Development	Bioretransformation	Non-Healthcare Analytics	R&D in house	R&D contract	Man in house	Man contract	Supply chain
Specialist Services	20	1		3	4	3	6	2	2	10	6	4	2	6
Biofuels	16	6	1	3	9	1		1		12	1	9		
Environmental	7				5				1	2	1	4		5
Food & Drink	5	1		1	1	1			1	1		4	1	1
Commodity Chemicals	1	1								1		1		
Fine & Speciality Chemicals	3				1			1		2	1	2	1	
Pharma Intermediates	3							1		1	1		1	2
Personal Care/ Cosmetics	0													
Totals	55	9	1	7	20	5	7	5	4	29	10	24	5	14

As any given company can be using more than one technology and more than one business model, it is not possible to add up the technologies and business models horizontally to give the number of companies in the “Number of Companies” column. In some cases technology information was not available so the technologies are less than the number of companies (e.g. Pharma Intermediates).

Of the 55 industrial biotechnology companies in the database, two thirds are either specialist services companies or biofuels companies. This indicates the UK has strengths in a wide range of industrial biotechnologies but these are mainly being applied in the production of biofuels. The UK government is encouraging the development of bioprocessing in the chemical industry via the National Industrial Bioprocessing Facility⁴³ and TSB grants⁴⁴.

In addition to the 55 industrial biotechnology companies in the database that have their primary biotechnology activity in the industrial biotechnology sector, there are a further nine other companies in the medical biotechnology sector that are undertaking some industrial biotechnology activities. These secondary industrial biotechnology activities include activity in the pharmaceutical intermediates, biofuels, environmental, specialist services and personal care/cosmetics segments.

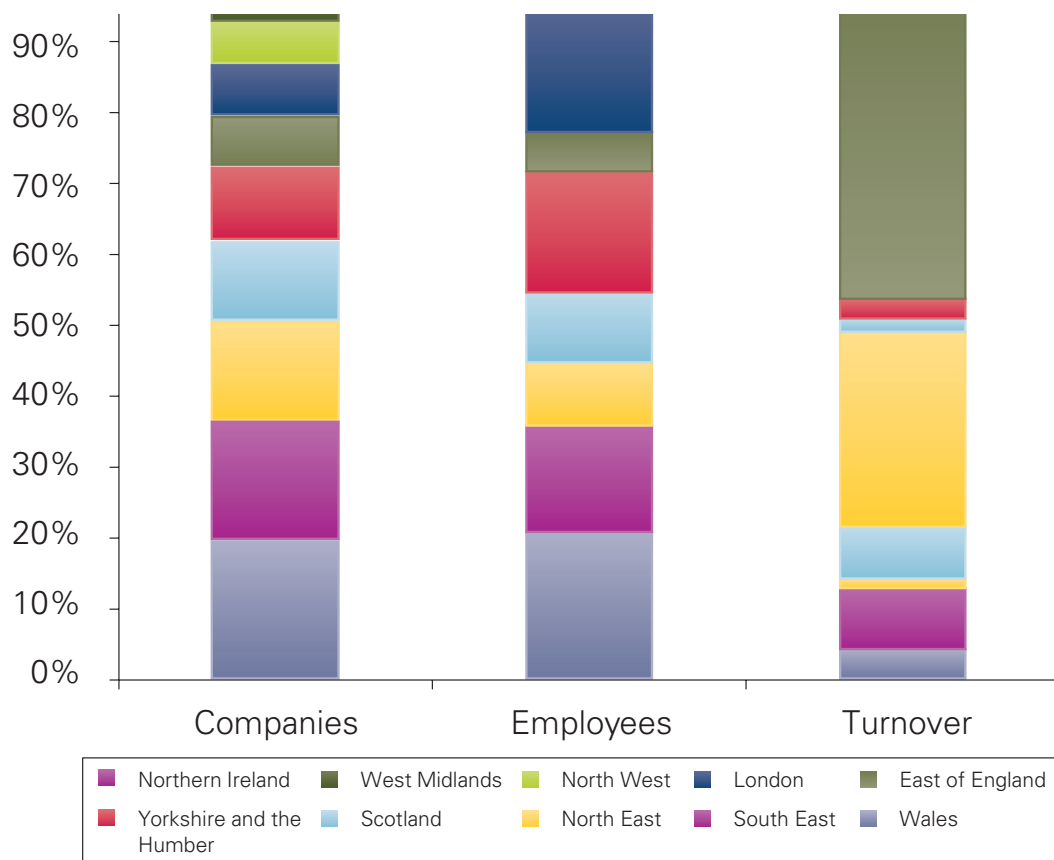
43 www.uk-cpi.com/nibf/

44 <http://www.innovateuk.org/>

4.5. UK Picture

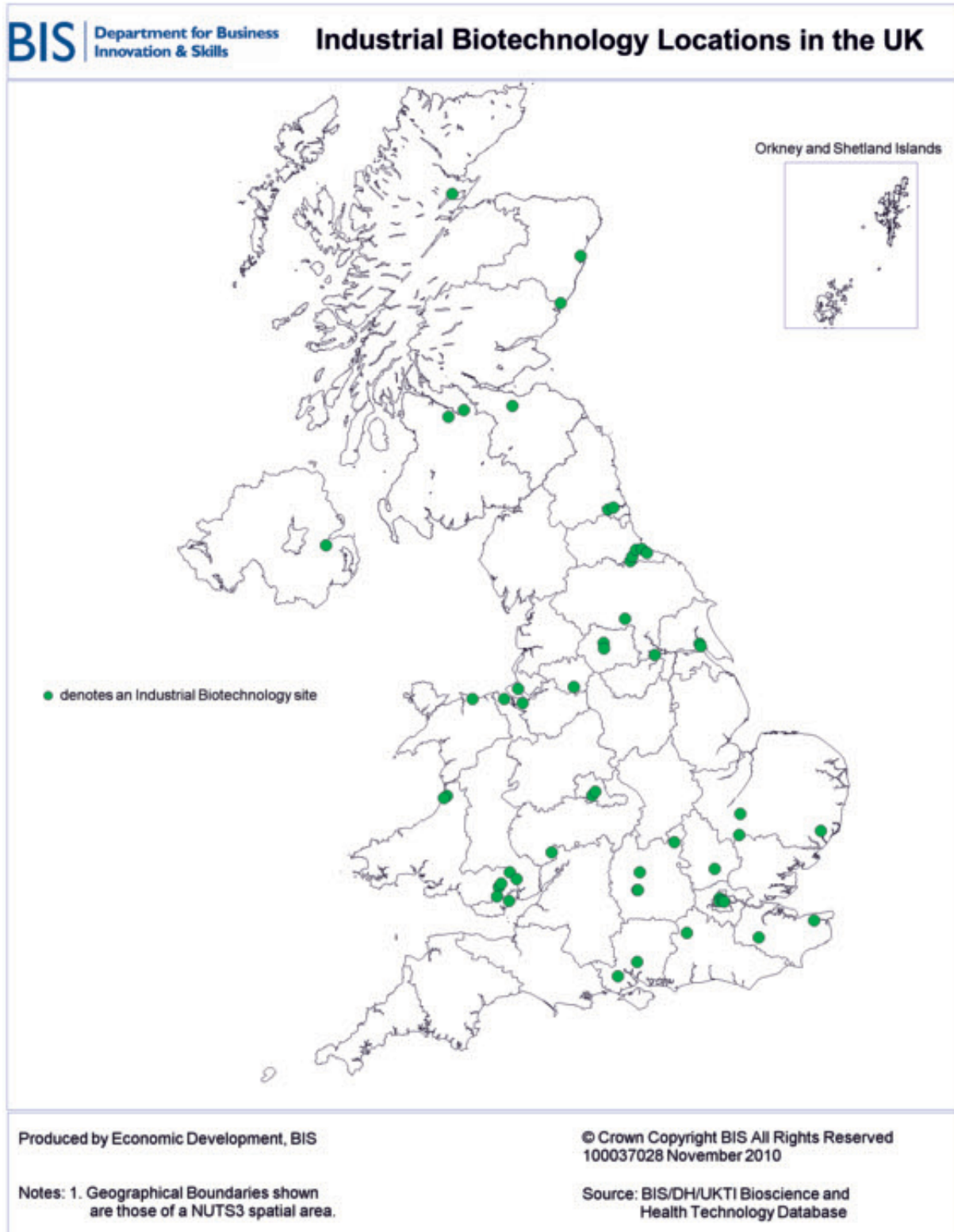
The industrial biotechnology sector is relatively small compared with the other two sectors in the database so individual companies make a significant impact on the UK distribution. The number of IB companies across the UK is relatively even but with peaks in Wales and the North East. Turnover is dominated by companies in the North West of England and in Yorkshire & Humberside.

Figure 35. *Distribution of Companies Employees and Turnover for the UK Industrial Biotechnology Sector*



4.6. Geographical Distribution of industrial biotechnology companies

Map 3 Geographical Distribution of industrial biotechnology companies



UK Industrial Biotechnology industry – Profile

- A total of 55 companies with a combined in-scope turnover of £308m.
- The sector employs 1083 people.
- 65% of companies undertake R&D.
- 27% of all companies are SMEs.
- The specialist services sector has 50% of the total turnover.
- The top four segments: specialist services, fine & speciality chemicals, food & drink and biofuels make up 96% of the sector turnover.
- Sector employment has risen by 16% from 2009 to 2010.
- Sector turnover has fallen by 2% from 2009 to 2010.

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	One Nucleus
East Midlands	Medilink East Midlands
London	London First (now part of One Nucleus)
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 West	South West RDA
Wales	Medi 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	British Healthcare Trade Association (BHTA)
National	The BioIndustry Association (BIA)
National	Biosciences 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 license. 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 on the medical technology and medical biotechnology pipelines sourced under license from BioPharm Insight.

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

The database construction, data integration, data analysis and commentary preparation was completed by a consortium lead by Cels Ltd. The consortium included Click2 (database construction), Kepier Ltd and Lindum Ltd (data integration and analysis).

Database Construction – Methodology and Segmentation

Scope

The database covers the geographical area encompassed by nine regional areas in the 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 in Appendix III.

To date, the delivery team have undertaken a 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 schemes⁴⁵ currently adopted by other organisations. This single level scheme was devised to be compatible with the reference schemes.

⁴⁵ BioIndustry Association, BioPharm Insight, British National Formulary

Most medical biotechnology companies that are 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.

All companies have been analysed to Level 0.

The segmentation used to Level 1 is shown in Appendix III.

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

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

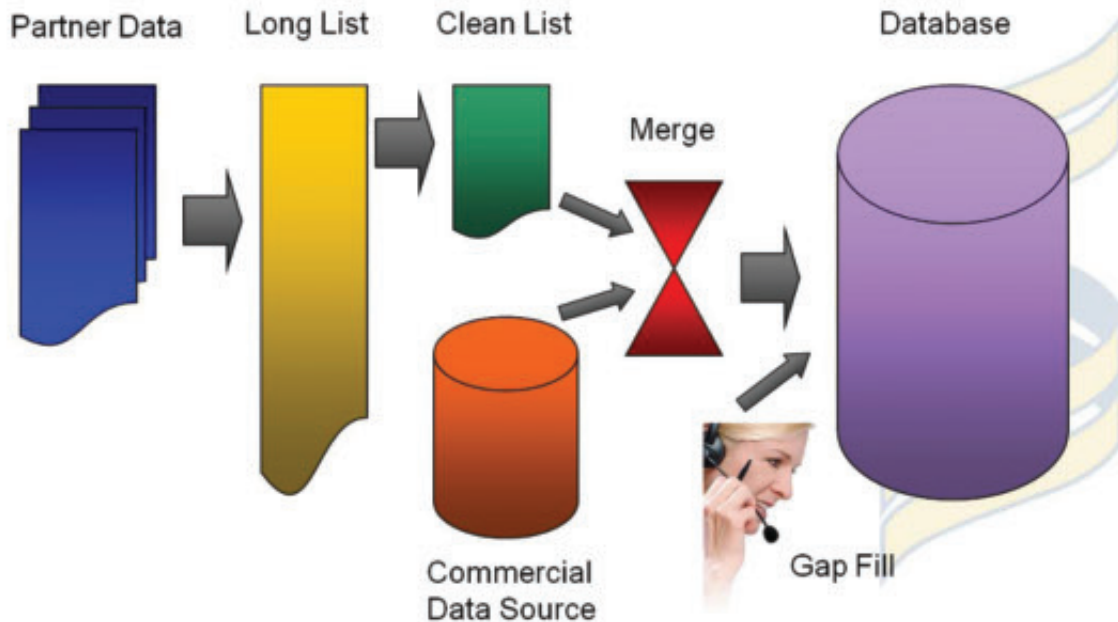
Industrial Biotechnology	
Code	Description
IBA	Biofuels
IBB	Environmental
IBC	Food and Drink
IBD	Commodity Chemicals
IBE	Fine & Speciality Chemicals
IBF	Pharmaceutical Intermediaries
IBG	Personal Care/Cosmetics
IBH	Specialist Services
IBZ	Unclassified

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 the 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 Dijke'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 modeled 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).

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