



HM Government

Strength and Opportunity 2013

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

Annual Update – 2013



This is the fifth annual report that analyses the information contained in the Bioscience and Health Technology Database.

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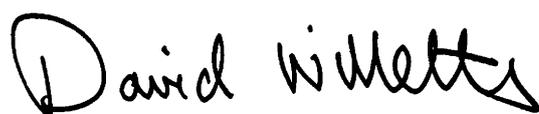
Ministerial Foreword

I am very pleased to present this report, which updates our current state of knowledge about one of the UK's most important industries. Pharmaceuticals, medical technology and biotech, are all seeing fast-paced change in scientific understanding and its practical application, driving rapid evolution and development in healthcare and related fields. Over the past year, UK players have firmly retained their place at the frontline of these developments, ensuring that overall turnover in the UK life science industry remains high and the contribution to the UK economy and employment levels remains very strong. This report underlines that the UK, with its world class research institutions and the unparalleled resource of the NHS, remains one of the best places in the world for life sciences.

In addition to the role played by the sector in the UK economy, its contribution to human health and welfare is fundamentally important. At the G8 Dementia Summit in December last year, the Prime Minister underlined our dependence on the life science community in global action against dementia and other current global healthcare priorities.

The predominant status of life sciences industry in the UK economy is reflected in the Government's ongoing commitment to the sector. The Strategy for UK Life Sciences, launched two years ago, continues its support for life science companies at every stage in the product lifecycle: from research and development through to commercial manufacture and uptake. For example, our £180m Biomedical Catalyst is providing funding to support promising new ideas to get closer to market. The £2bn investment by life science companies announced in the two years since the Strategy was launched is a testament to the confidence currently felt about the UK as a place to do life sciences.

As ever, this report contributes importantly to our understanding of the number, type and geographical distribution of life science companies in the UK, as well as allowing us to observe the changes being driven by fluctuations in the deployment of those life science companies with a global footprint. I hope that this continues to be a helpful resource for people looking at the shape of the sector and trends over time. I would like to thank everybody who has contributed, in particular the Trade Associations, Medilinks and life sciences networks.



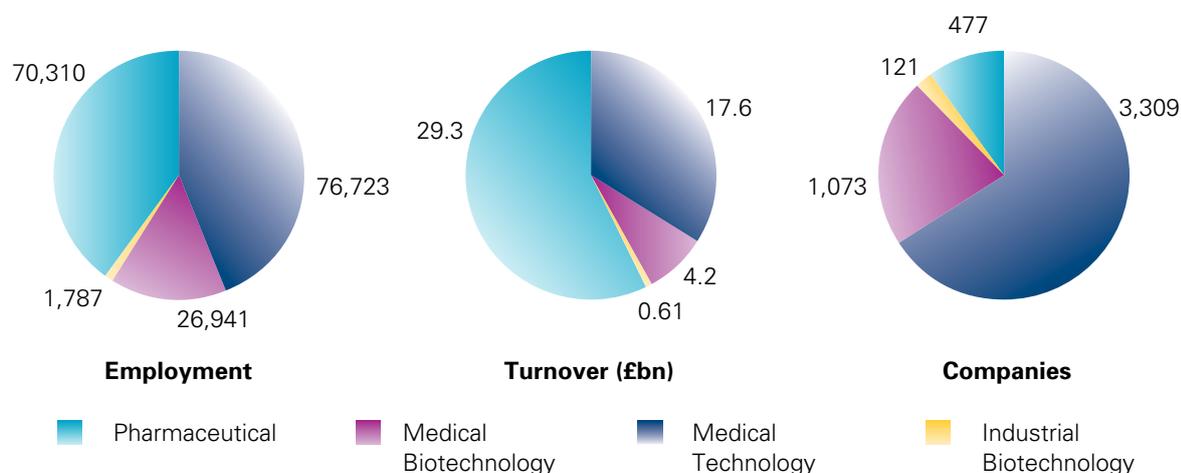
The Rt Hon David Willetts MP
Minister for Universities and Science
DEPARTMENT FOR BUSINESS,
INNOVATION AND SKILLS

Executive Summary

The Bioscience and Health Technology Database collates company information on the medical technology, medical biotechnology, industrial biotechnology and pharmaceutical sectors in the UK. Based on information in the database, the life sciences sector in the UK consists of 4,980 companies developing, producing and marketing products and services in the pharmaceutical, medical technology, medical biotechnology and industrial biotechnology markets. In total the sector employs 176,000 people¹ in high technology companies across the UK. The industry sells into a global industry with current total market values of £612bn for pharmaceutical and biologics², £223bn for medical technology³ and £32bn for the rapidly growing industrial biotechnology market⁴. These markets have historical strong growth rates and forecast rates are 8-10% per annum. Life science companies based and operating in the UK generate £52bn in turnover¹ from sales into the UK and overseas and this represents approximately 6% of the world market sales.

Figure 1 shows the composition of the UK life science industry defined by the four major sectors in terms of employment, turnover and number of companies.

Figure 1. *The composition of the UK life science industry defined by the four major sectors in terms of employment, turnover and number of companies*



In contrast to data from previous years, in 2013 the medical technology sector is the largest sector employer in the database, followed by the pharmaceutical sector. This outcome is due to more medical technology companies being included in the database this year that were not previously identified for inclusion in earlier years, consistent year-on-year growth in the medical technology sector and recent decreases in employment in the pharmaceutical sector.

Based on information in the database, the pharmaceutical sector retains its position as generating the largest turnover in the life science industry – £6.7bn more than the all the other sectors combined. The Top 20 global pharmaceutical companies that record sales in the UK account for £19.7bn or 67% of the pharmaceutical sector’s turnover based on 2012-2013 data.

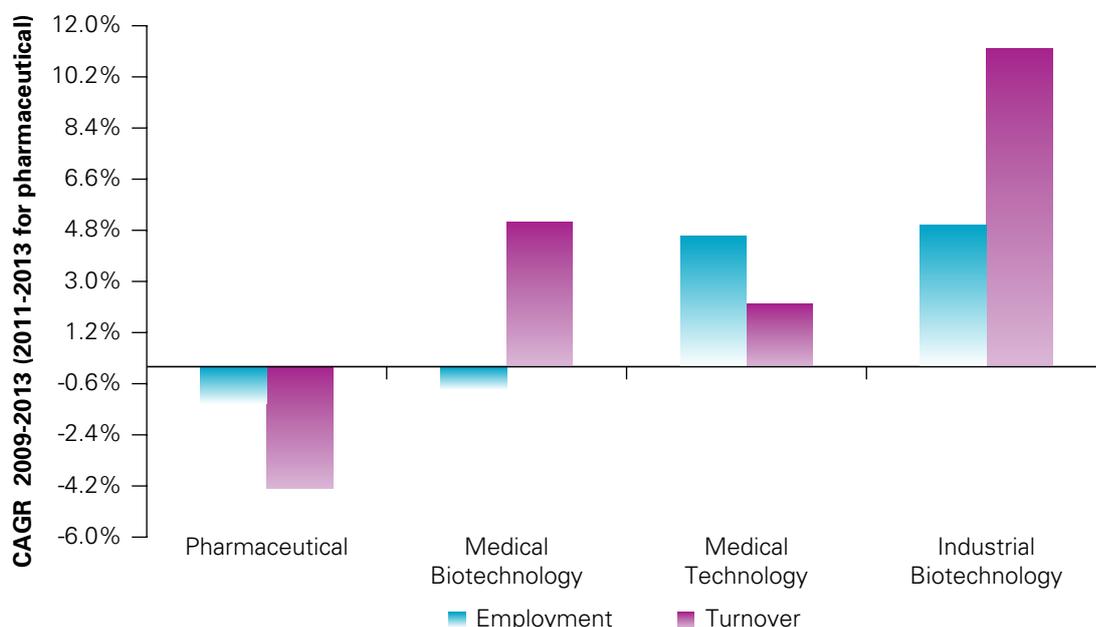
The database suggests that in 2013 there are 4,980 companies in the life sciences industry, compared with an estimate of 4,404 in 2012. This increase is primarily the result of identifying 723 companies across all segments that were not captured in earlier data gathering processes. These additional companies have increased total life sciences industry turnover and employment by 3.5% and 4.1% respectively in 2013 compared with 2012. **Figure 1** shows the distribution of companies across the four major sectors and highlights that 66% of all life science companies are in the medical technology sector.

Analysis of the performance of 50% of the companies in the database⁵ that collectively account for 61% of the employment and 91% of the turnover respectively, indicates that the life science industry turnover shrank 4% between 2011-2013 driven primarily by a decrease in turnover in the pharmaceutical sector. However, excluding pharmaceuticals and looking over the period 2009-2013, the medical technology sector showed a compound annual growth rate (CAGR) trend in turnover of 2%, with medical and industrial biotechnology showing trends of 5% and 11% respectively over the same period.

The total employment in the industry fell 2% between 2011 and 2013 driven by a 2.7% decrease in the pharmaceutical sector, which was not compensated by the strong growth in the medical technology sector. The database and trend set data will not reflect the impact of changes in employment announced in 2013.

Figure 2 summarises the turnover and employment trends for the four life science sectors over 2009-2013. The strong growth in the medical technology and industrial biotechnology sectors is apparent. While the medical biotechnology sector experienced growth in turnover, employment dropped at a CAGR of 0.8% over 2009-2013.

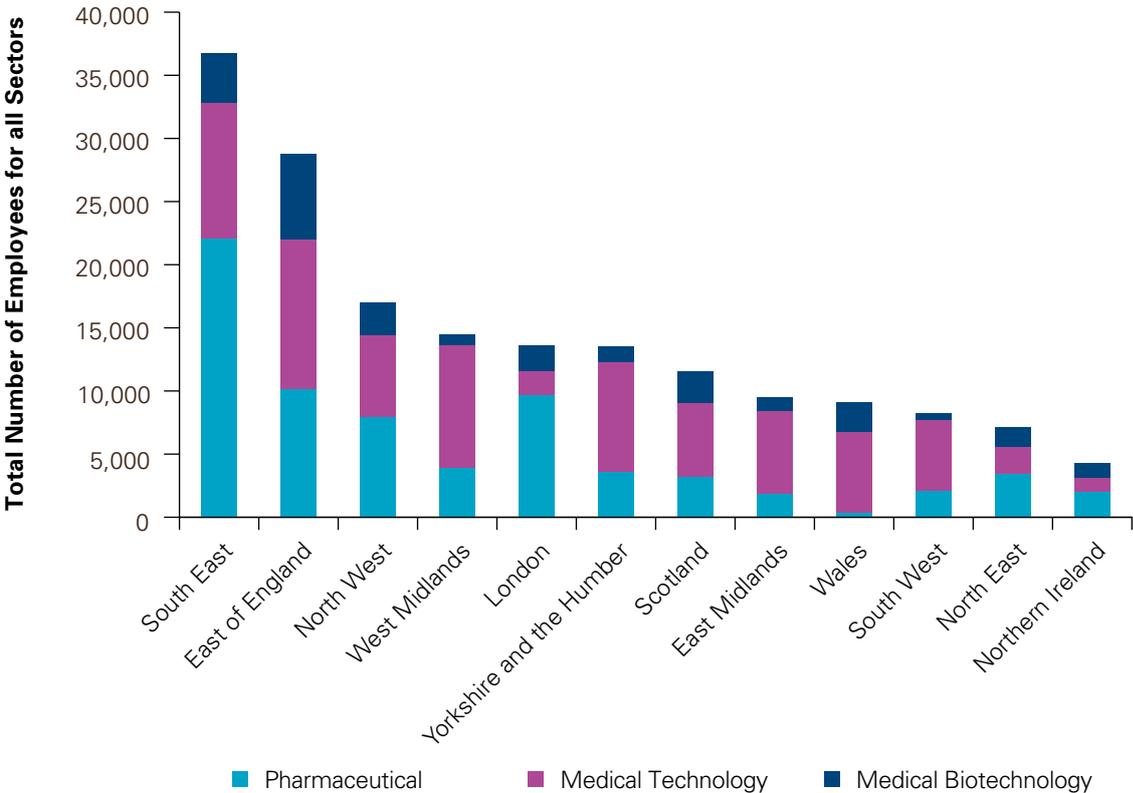
Figure 2. *Employment and Turnover CAGR% from 2009 to 2013 (2011 to 2013 for pharmaceutical) for the four UK life science sectors (based on trend sets of companies from each sector)*



All sectors, particularly the pharmaceutical and medical biotechnology sectors, outsource a significant proportion of activity to large supply chain networks. The specialist suppliers and services sector is therefore integral to the overall life science industry. Across all the life sciences sectors in the database there are an estimated 1,400 companies that supply services such as clinical trials management, assay development, regulatory advice, design expertise and products such as reagents and specialist equipment. Companies in the database carrying out this activity employed an estimated 31,800 staff and generated a turnover of £6.3bn in 2012-2013.

Economic activity in the life science industry is spread throughout the UK, although there are geographical concentrations. Pharmaceutical and medical biotechnology sites and their associated employment are concentrated in the South and East of England including London, along with the North West of England and Scotland. The medical technology sector is more widely distributed. **Figure 3** provides a summary of how employment is distributed across the UK for all sectors (except industrial biotechnology). All geographical areas have employment in all sectors, although the relative proportion of employment per sector varies. The emerging industrial biotechnology sector employment is spread across the UK with no obvious geographical concentration.

Figure 3. *Distribution of Medical Technology, Medical Biotechnology and Pharmaceutical Employment across the UK*



Medical Technology

The database captures 3,309⁶ medical technology companies in the UK. 99% of these are SMEs – the sector contains 31 companies that employ more than 250 people.

All of the Top 10 global medical technology companies have activity in the UK and 28 companies have turnovers greater than £100m. In total, these companies employed just fewer than 76,700 individuals and had a combined turnover of £17.6bn.

The trend set of companies, consists of 1,761 companies⁷ that account for 53% of all sector turnover and 65% of all employment. In that group turnover increased 9% between 2009 and 2013 equivalent to a CAGR of 2%. Over the same period, sector employment increased 20%, representing a CAGR of 5%. Since 2010 the trend data set of companies in the medical technology sector has seen year on year growth in employment.

The top five segments of the medical technology sector in the database in terms of employment and turnover, were single use technology, wound care, orthopaedic devices, in-vitro diagnostic technology and professional and specialist services. The professional and services companies are important components of the supply chain to the sector supplying products and services such as equipment, reagents & materials, manufacturing and regulatory and design services.

Increased employment has been observed in nine of the top ten largest segments when the data from 2009 is compared with 2013. In-vitro diagnostics, orthopaedic devices and drug delivery all show increases of greater than 30% between these years. The professional service segment was the only segment in the top ten that showed decreased employment over this period.

Companies in wound care management and in vitro diagnostic technology were the most improved segments in the database in 2013, reporting increases of 13% and 8% in turnover respectively and contributing a total of £2.7bn to the overall turnover for the sector. Other top segments showing an overall growth in turnover were single use technologies and orthopaedic devices. However, the highest growth rates in turnover were recorded in some of the smaller segments in the database. Cardiovascular and vascular devices showed increased turnover of 40% between 2009 and 2013, followed by ICT and e-Health and infection control with 34% and 30% respectively.

The medical technology companies from the database are dispersed across the UK with greater concentrations found in the Southeast, East of England and in the Midlands where a total of 57% of all companies are located.

Medical Biotechnology

The medical biotechnology sector in the UK, based on information in the database, consists of 1,073 companies of which approximately one third are involved in the discovery and development of new drugs based on biotechnology with the remainder involved in supply chain activities. The sector generated a turnover of

£4.2bn in 2012-2013 and employed 26,900 people⁸. The sector is dominated by SMEs and 48% of the companies are less than 10 years old.

Companies involved in the development of drugs based on antibody and small molecule technology make up the largest segment by turnover and employment. Based on the number of companies the largest segments are small molecules followed by therapeutic proteins and regenerative medicine. This sector has a large supply chain of service-based companies, many of which also supply the pharmaceutical sector. This combined specialist services sector consists of 903 companies with a turnover of £4.2bn employing 23,350 people. The largest specialist suppliers are those involved in providing clinical research and management services, contract manufacturing, assay development and reagent supply.

Based on a sample of 380 companies, turnover increased 22% from 2009-2013 driven primarily by companies in the small molecules segment, although there was a drop between the 2012 and 2013 data. The data on turnover will include items such as licence milestone payments that can fluctuate over time and will not take account of expenditure on internal research, therefore the overall economic activity in this segment is likely to be underestimated when measured solely by turnover. Over this same period the sector saw a decrease in employment of 3.1%.

Medical biotechnology companies in the East and Southeast of England have significant levels of employment and turnover compared to other areas. Including London, this area has an estimated 50% of all medical biotechnology companies and associated employment and turnover. Other significant concentrations of economic activity are in the Northwest of England, Scotland and Wales. The distribution of companies in the specialist supplier segment shows a wider distribution of activity with significant activity in Scotland and the Midlands.

Industrial Biotechnology

The industrial biotechnology sector in the UK, based on information in the database consists of 121 companies with a turnover of £605m and employs 1,790 staff. The top three segments in terms of employment and turnover are biofuels, companies that provide products into the food and drink market and the specialist services segment. In the latter segment, companies that produce and supply enzymes are the largest contributor to turnover and employment.

The analysis focuses on companies that have the majority of their turnover based on supplying industrial products and services using biotechnology. Therefore the overall economic contribution of industrial biotechnology will be greater than measured by this analysis alone. As an example, turnover or employment associated with the incorporation of a single but important biotechnology process in the production of a pharmaceutical or fine chemical is not measured by this analysis.

Industrial biotechnology has been used for many years, however as defined in this commentary, the sector can be characterised as a rapidly growing and emerging industry. All companies in the sector, outside of the major enzyme suppliers, are SMEs. From a low base the sector is showing high growth rates in both employment

and turnover. Between 2009 and 2013, companies that make up greater than 75% of all employment and turnover in the sector have increased turnover by 53% and employment by 21%. Companies in the biofuels segment have contributed the most to this growth.

Economic activity in the industrial biotechnology sector is distributed across the UK and, at this stage in the sectors development, shows no discernible geographical concentration.

Pharmaceuticals

The pharmaceutical sector in the UK, based on information in the database, generates a turnover of £29bn, the majority of this through the sales of innovative medicines. The sector employs 70,300 people in 477 companies. The Top 20 global pharmaceuticals companies, defined on the basis of global sales, account for 67% of the UK sector turnover and 57% employment. Outside of the global Top 20 there is a significant group of large and medium sized pharmaceutical companies that employ 16,400 people across the UK. The segment that consists of companies involved in the wholesale of drugs and those involved in production and distribution of generic versions of drugs is the next largest segment in the database.

The sector contains a high proportion of non-SME companies, with 15% of all companies in the database employing greater than 250 staff.

Based on a sample of 226 companies that account for 84% and 62% of all sector turnover and employment respectively, turnover for these companies fell 9% between 2011 and 2013 and employment decreased by 2.7%. Global re-structuring in the Top 20 global companies was the major driver behind the employment decreases, although there were also significant falls in employment in the wholesaler/generics companies. The group of other large to medium sized pharmaceutical companies in the database recorded increases in turnover and employment, as did the specialist suppliers, which recorded the highest percentage increase in employment at 7%.

The pharmaceutical industry has sites and activity in all areas of the UK although there are clear areas where employment and sites are concentrated. Together the Southeast, London and East of England contain 60% of the employment and 66% of the sites for the sector, with the North West of England the fourth largest region in terms of employment. In the Southeast, London and East of England there are an almost equal number of sites designated as R&D and manufacturing, while other areas have predominately more sites designated as manufacturing.

Introduction

This fifth Strength and Opportunities report analyses the results of the 2013 annual review of the UK life science industry. The primary source of data is the Bioscience and Health Technology Database, an initiative of BIS, the Department of Health and UKTI, set up in 2009. The creation and maintenance of a national database is supported by the Devolved Administrations, national and regional industry bodies, the Medical Research Council and the Biotechnology and Biological Sciences Research Council. These organisations continue to provide support annually by providing information sources on companies in their sector or geographical area. Appendix I list the data partners that have provided support and assistance.

The database provides a more detailed source of information on the private companies across the UK active in the life science industry than is possible based on the Standard Industry Classification codes. When established in 2009, the database covered the medical technology, medical biotechnology, and industrial biotechnology sectors. The process to extend the database to include the pharmaceutical industry, largely composed of global companies, was begun in 2010 with data included for 2011 and beyond.

A summary of the methodology used to construct and maintain the database is given in Appendix II and the segmentation coding used for classifying company products and services is provided in Appendix III.

On completion of the annual update in 2012, the database contained just over 4,500 companies across the medical technology, medical biotechnology, industrial biotechnology and pharmaceutical sectors. In this year's cycle of data gathering, a relatively large number of companies that had existed since 2009 or before were identified as within scope. This is the result of extensive efforts by a number of the data partners to identify companies that had not been captured previously and give a more comprehensive representation of the UK life science industry.

If using the database for comparison purposes or trend data, it is important to note that in total in the 2013 update, 723 companies were added to the database that have been existence for 12 months or more (companies that existed for less than 12 months are classified and identified as "births"). Of these companies, 388 were added to the medical technology sector, 149 to medical biotechnology, 45 to industrial biotechnology and 141 to pharmaceutical. In total 297 or 41% of the companies added were classified as specialist suppliers or consultants. The additional companies resulted in an increase of 3.5% and 4% the total life science turnover and employment respectively in the database.

Figures 4-6 summarises the impact of the companies added to database on company numbers, turnover and employment.

Figure 4. Number of companies added to the database by sector (only companies that are over 12 months old are shown as additions)

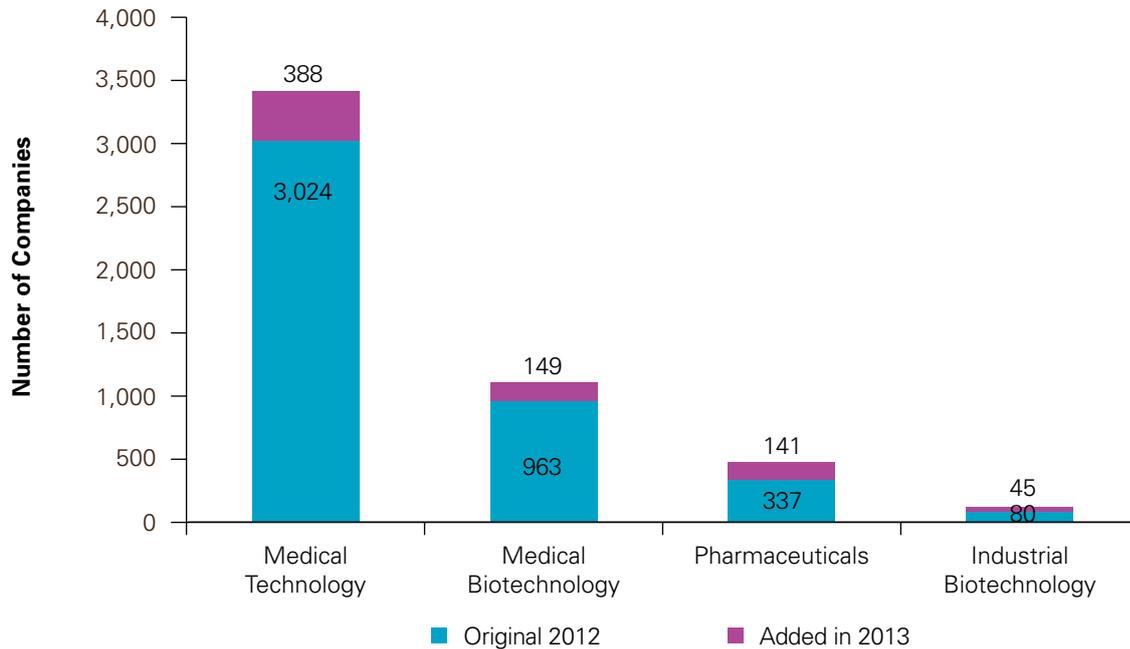


Figure 5. Impact of additional companies on sector turnover totals

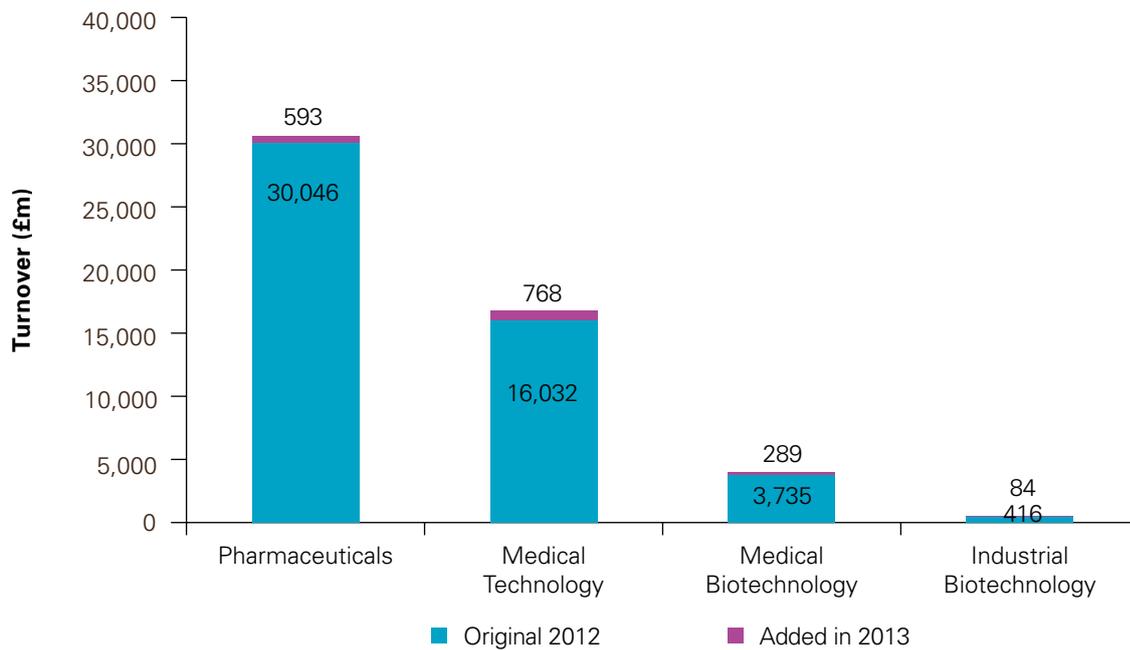
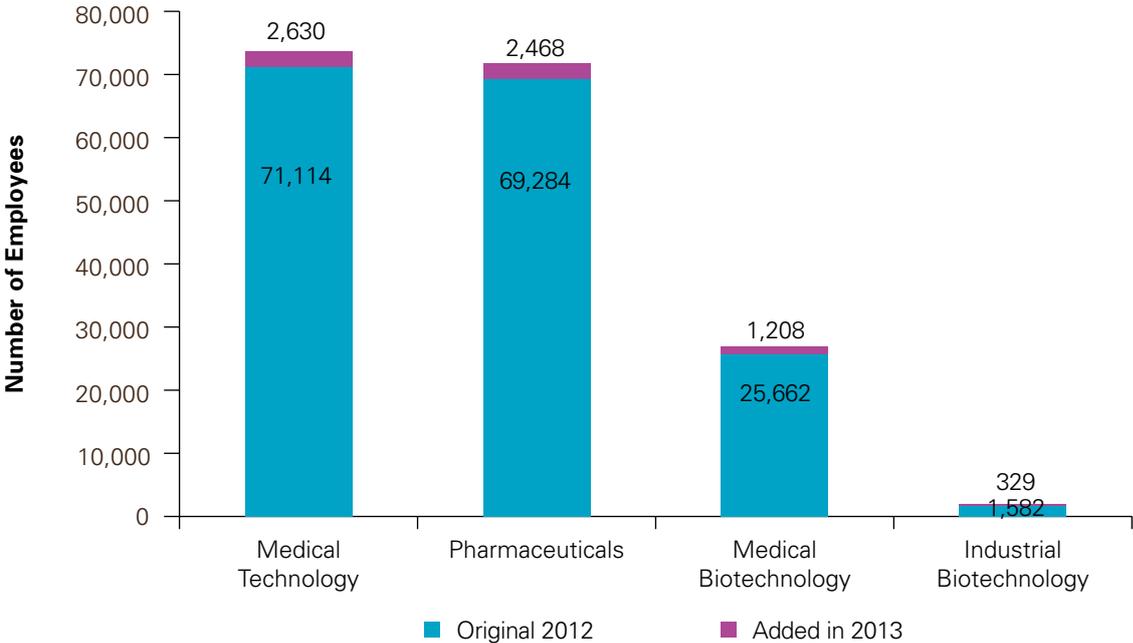


Figure 6. Impact of additional companies on sector employment totals



Trends in the industry and for individual sectors were calculated using records from 2,477 companies; 1,761 for medical technology; 409 for medical biotechnology; 81 for industrial biotechnology and 226 for the pharmaceutical sector. Financial and employment data was sourced from the datasets held by Dun & Bradstreet (D&B) and Bureau van Dijke’s FAME (FAME).

In a number of the analyses used to generate the figures there is an “Unknown” category where for example the location of turnover associated with a company’s site could not be assigned. This category was a relatively low percentage of all the figures presented, but will mean that some figures may not be the same across certain analyses.

Global Sector Market Overview

The medical technology, medical biotechnology, industrial biotechnology and pharmaceutical sectors are linked by their focus on the healthcare market place and their use of biotechnology or the biological sciences. Companies working in these sectors produce products and services for markets that are global in scale and require innovation for continuing success. Globally, the medical technology, medical biotechnology, industrial biotechnology and pharmaceutical sectors have estimated combined sales of £0.6-1tn with R&D spend to sales ratios higher than 10%. Estimated future growth rates in these markets continue to show strong positive trends with rates of 4-10% predicted over the next 8-10 years^{9,14,19}.

1.1. Medical Technology Market

The medical technology market is estimated to have global sales of £223bn in 2012 with an annual compound growth rate (CAGR) of around 7% over the past seven years⁹. Latest submissions from the top 180 companies indicate the market is expected to continue to grow at a reduced rate of 4.5% per annum until 2018 reaching anticipated global sales of £291bn¹⁰.

Growth will continue to be led by the in vitro diagnostics segments, driven by diagnostics for stratified medicine, an emerging area which links the pharmaceutical and medical technology sectors. In vitro diagnostics is one of four segments, including cardiology, imaging and orthopaedics that together are forecast to make-up 40% of total medical device sales worldwide by 2018. Based on current trends significant sales growth is also predicted in the smaller sectors of ophthalmic, ear nose and throat, neurology and plastic surgery¹¹.

These market trends are motivating the industry to find new ways to create, capture and deliver value. Global R&D investment for the top 20 medical technology companies was £13.4bn in 2012 representing 8% of total sales and is expected to continue to grow by 3.9% per annum to £17.3bn in 2018. In 2012 the FDA approved 41 new devices and awarded 510K clearances to 3,185 devices in the US market^{12,13}.

1.2. Medical Biotechnology Market

The global sales of pharmaceuticals based on biotechnology or biologics is estimated at £105bn in 2012 representing some 21% by value of the worldwide sales of pharmaceuticals. The growth in the sales of biologics has outpaced the overall market growth rate by 2-7% for the last five years^{14,15}. The importance of biologics is further emphasised by looking at their share of the Top 100 selling drugs, where biologics accounted for 39% of sales in 2012 and in the Top 10 selling drugs they accounted for 71% of sales last year¹⁶.

Biologics as a product class include monoclonal antibodies (mAbs), recombinant hormones (including insulin analogues and erythropoietin) as well as vaccines and drugs based on RNA and DNA. The recombinant hormones (where insulin analogs

account for 75% of sales) and mAbs have led the overall growth in biologics, with mAbs sales growing from £7.9bn in 2006 to £13bn in 2011¹⁷.

The pipeline of biologic products continues to remain strong with 907 products in clinical trials in 2012, an increase of 155% in the 11 years since 2001 when the pipeline consisted of 355 products. Global investment in medical biotechnology research has increased from £6.7bn in 2001 to £66bn last year¹⁸. The combination of strong sales from existing products and a strong pipeline means that biologics are expected to command an increasing share of the world pharmaceutical market with estimates indicating that 25% of all sales revenue will come from biotechnology in 2018. This share of the market equates to £130-190bn worldwide sales of biologics and growth rates of 8-10% pa¹⁹.

1.3. Industrial Biotechnology Market

Industrial biotechnology, sometimes referred to as white biotechnology, is the application of biotechnology for industrial purposes, including the manufacture of feedstock chemicals (e.g. succinic and lactic acids), fine chemicals (e.g. amino acids), biopolymers and bio-plastics and biofuels. The market has been in existence for decades with processes for the production of compounds such as citric, acetic and lactic acids being operated commercially since the beginning of the 20th century. Citric acid is reputed to be the first industrial scale fermentation with production beginning in 1916 and obviously ethanol production has been in an “industrial biotechnology” product for 6,000 years²⁰.

Since these early beginnings, the market has grown significantly; particularly in the last 20 years as the potential of the technology to contribute to policy targets for sustainable growth have been recognised. The market in 2011 was estimated at £32bn based on the market value of products such as amino acids, glycerin, lactic acid, vitamins and alcohols and involves some 4,000 companies worldwide^{21,22}. The production of industrial enzymes, a particularly strength of the European region, is another significant market with a global value of £1.9bn in 2011 for products used in the food, brewing, detergent and animal feed industries²³.

The biofuels market has grown rapidly since 2005 encouraged by mandatory use regulations²⁴. The global biofuels demand in the 2010 was estimated at 59.2bn US gallons consisting of mainly ethanol and biodiesel²⁵ produced from feedstock's such as corn, sugar cane and wheat. The market is particularly strong in the North and South America, with revenues within the USA accounting for 45% of the global market in 2011²⁶.

1.4. Pharmaceutical Market

The global market for medicines is forecast to grow from £612bn in 2011 to £770bn by 2016²⁷. Branded products sold under prescription dominate sales in this market, but generics sold under prescription and over-the-counter (OTC) products are forecast to take an increasing share of sales revenue – reaching £256-275bn by 2016²⁸. Total forecast market growth, while significant does represent a slowing of the annual growth rates from 6% between 2005 and 2010 to 3-6% between 2010 and 2015²⁹. This forecast is also a rebound from the sales performance over the last

few years. According to some analysts the market last year actually shrank by 1.6% (2012 compared to 2011)³⁰ led by softening of the markets for prescription drugs in the USA and Europe. In both markets the Top 20 companies (by global sales) collectively saw sales decline 2.7% and 3.3% in local currency between 2011 and 2012³¹.

The UK continues to be an important location for global pharmaceutical companies, particularly for their R&D operations. Over 2007-2010, one estimate gives the total drug and pharmaceutical inward investment in the UK at £7.3bn and estimates that 54% of this investment was in R&D operations, the highest in Europe³². In addition to inward investment, companies with existing operations or headquarters in the UK represent the most significant investors in business R&D in the UK. In 2012, UK R&D spend by the pharmaceuticals sector accounted for 24.6% of all R&D spend in UK businesses³³.

Medical Technology Sector

2.1. Sector Definition

For the purpose of this report, companies 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) and companies who have significant activity in supplying specialist services to the medical technology sector.

The definition of this sector is wider than that traditionally used, which is based on the regulatory definition of a medical device. Companies that provide specialist services represent a vital part of the medical technology overall supply chain and a significant portion of the sector employment. It is therefore useful to include them in the context of analysing the overall economic impact and trends of the medical technology sector.

The medical technology sector in the Biosciences and Health Technology database has been divided into 22 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 classified according to their primary activity from which the majority of turnover and employment is derived.

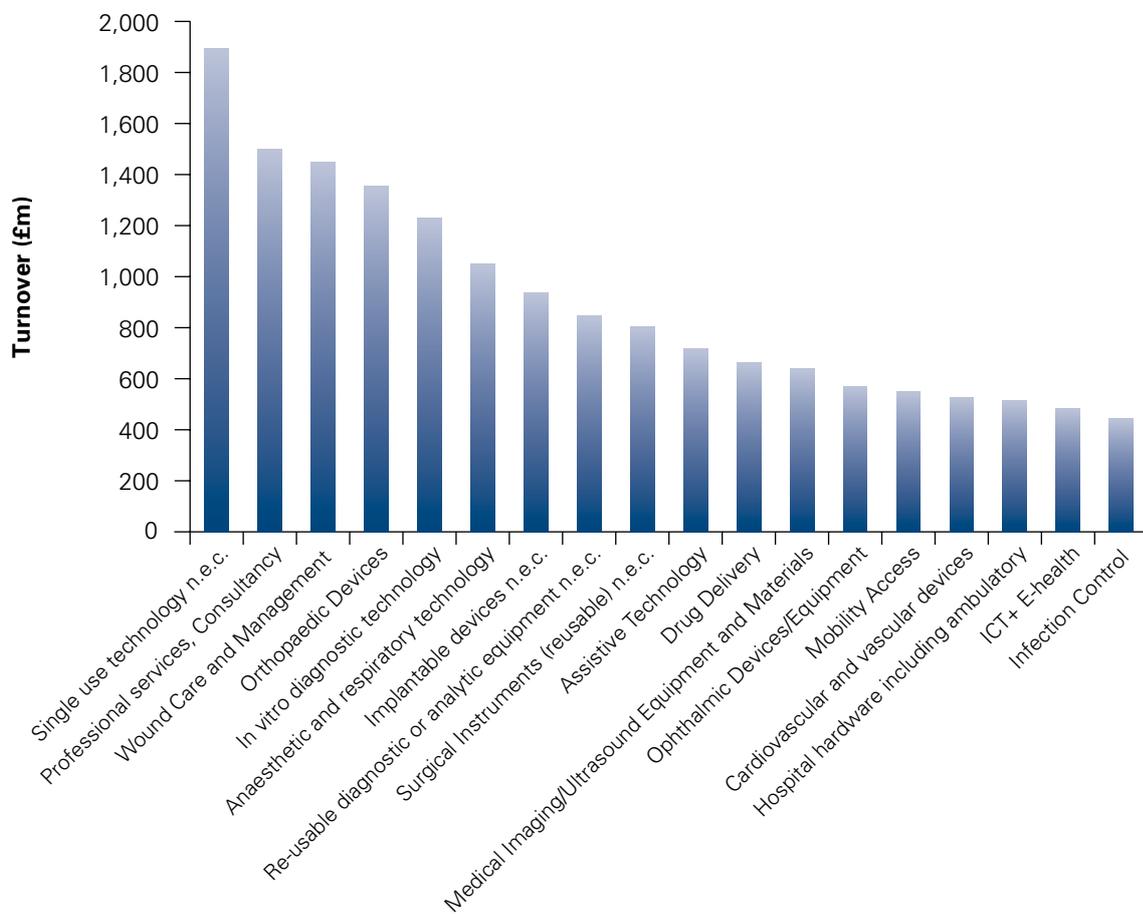
2.2. Sector Overview

- The medical technology sector consists of an estimated 3,310 companies generating a combined turnover of £17.6bn and employing 76,700 people.
- The largest segments in terms of employment and turnover are single use technology, in-vitro diagnostics, orthopedic devices, wound care and professional services.
- The sector grew employment and turnover at annual rates of 6-8% and 1-5% respectively over the period 2009-2013. Employment grew from 2010 onwards with a CAGR of 4.6%.
- All the largest segments grew turnover and employment except for professional services.
- The five fastest growing segments based on turnover were cardiovascular devices, ICT & E-health, infection control, mobility access, and anaesthetic technology.
- The majority of the sector companies are SMEs with 99% employing less than 250 staff and 85% with turnovers less than £5m.
- Economic activity for the sector is more widely dispersed across the UK compared to other life science sectors but with significant concentrations of companies in the East and West Midlands of England and the Southeast and East of England.

2.3. Turnover and Employment

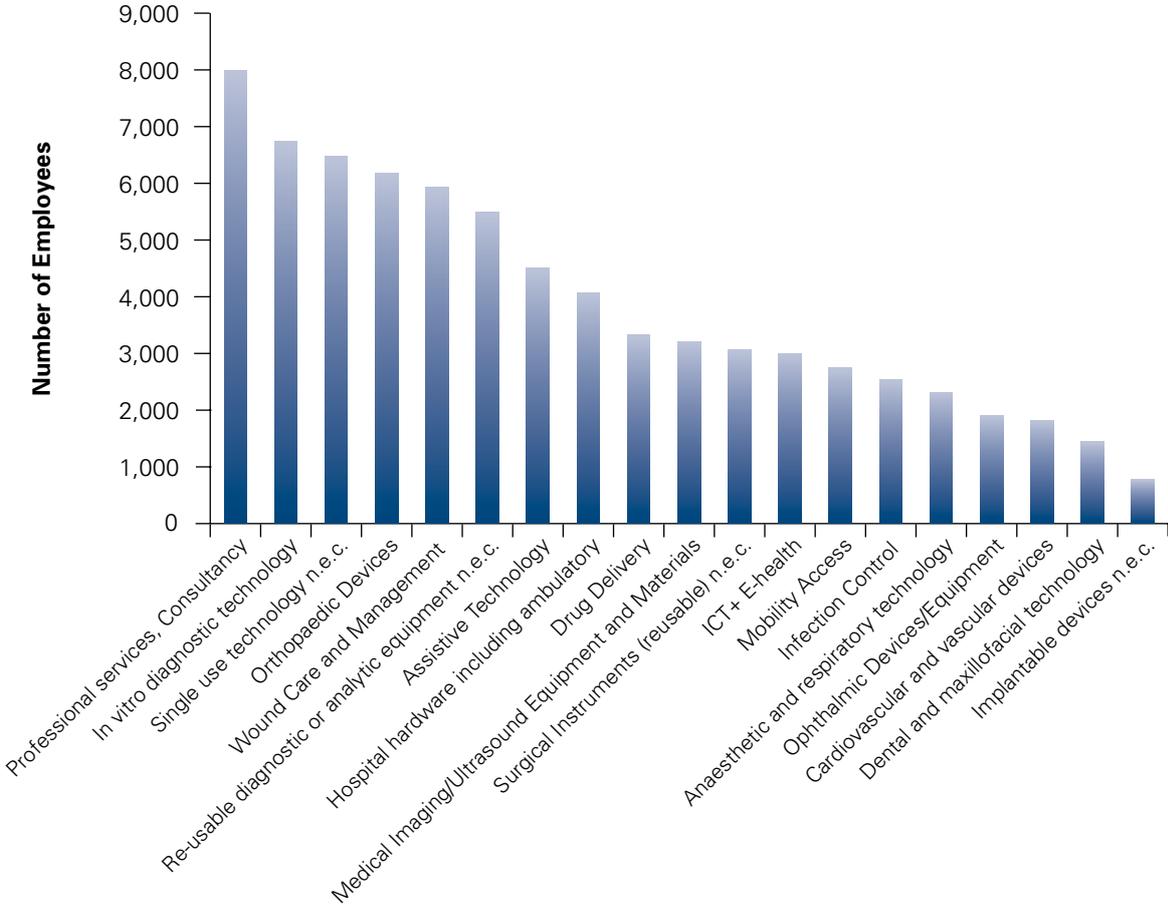
The medical technology sector recorded an annual combined turnover of £17.6bn for 2013 and the turnover is broken down by segment in **Figure 7**. The six largest segments, each achieving over £1bn in sales contributed 51% to the sector’s total turnover. These segments were single use technology, professional services including consultancy, wound care and management, orthopaedic devices, in vitro diagnostic technology and anaesthetic and respiratory technology. Turnover of under £100m was recorded in the following segments; radiotherapy, neurology and education and training

Figure 7. Turnover for the major segments in Medical Technology (only segments with >£200m shown)



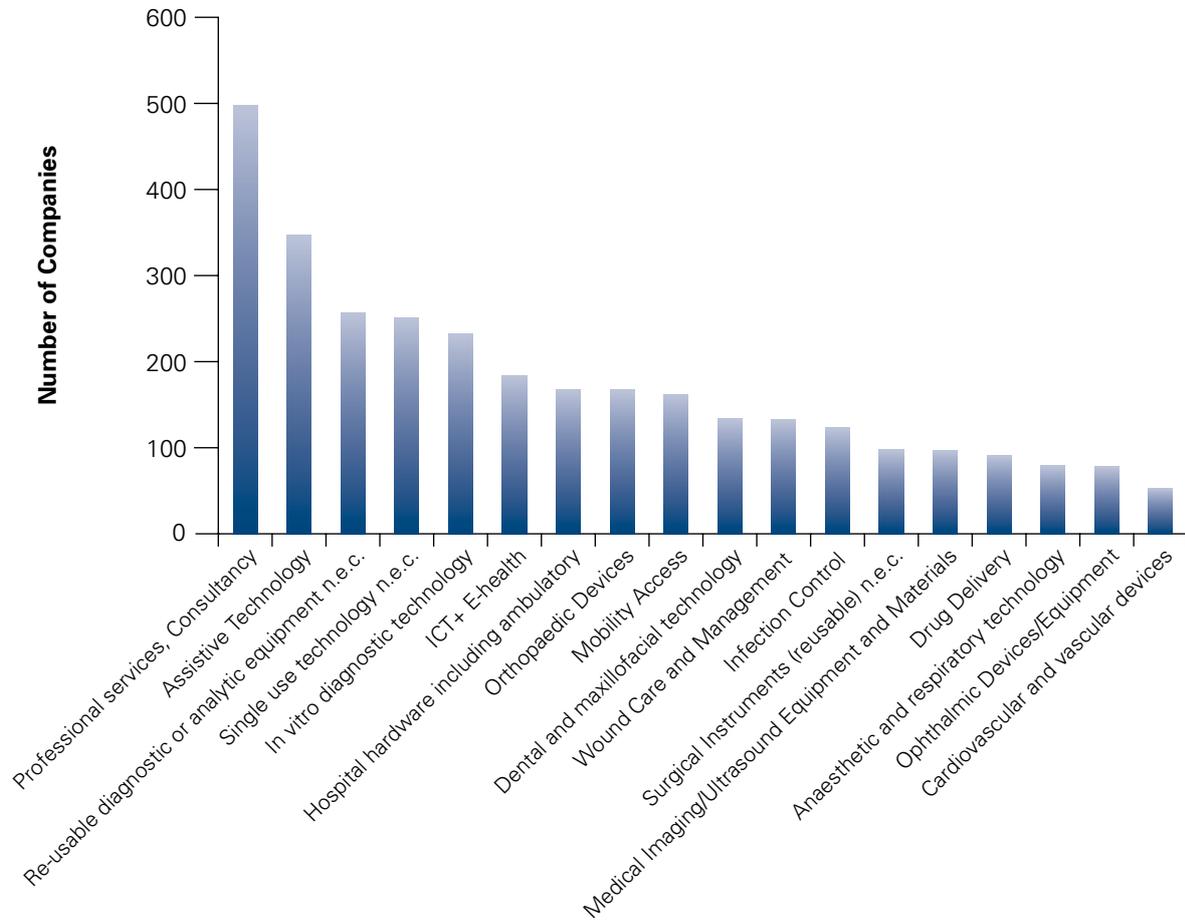
In 2013 there were a total of 76,700 people employed in the medical technology sector. As in previous years the highest number recorded were employed in professional services and consultancy. Most jobs were concentrated in the top ten segments as shown in **Figure 8** where 71% of all employment was recorded.

Figure 8. Number of employees for the major segments in Medical Technology (only segments with >500 employees shown)



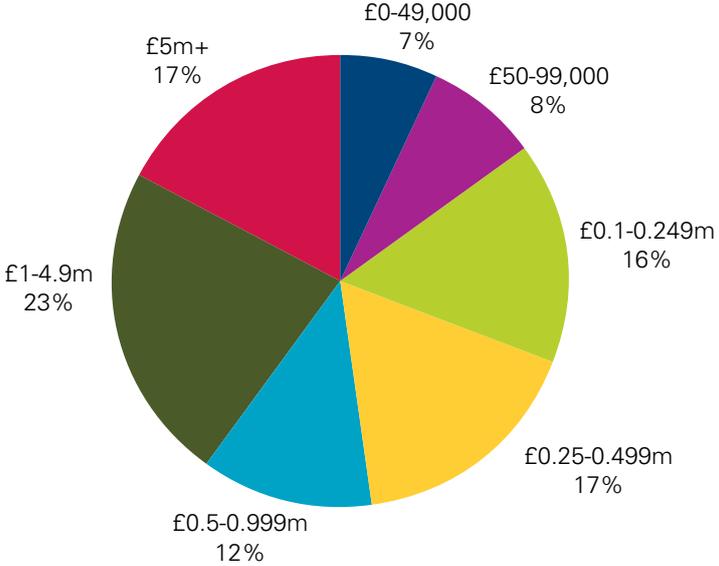
There were a total of 3,309 companies in the medical technology sector in 2013 and their distribution across each of the segments is shown in **Figure 9**. Just under 55% of the total is found in the six segments: professional services and consultancy, assistive technology, reusable diagnostic or analytical equipment, single use technology, in vitro diagnostics and ICT/Health. The largest segment overall was professional services and consultancy which remains the same as in previous years. The lowest numbers of companies were found in neurology, radiotherapy equipment, implantable devices and education and training.

Figure 9. Number of companies in the major segments for Medical Technology (only segments with >50 companies shown)



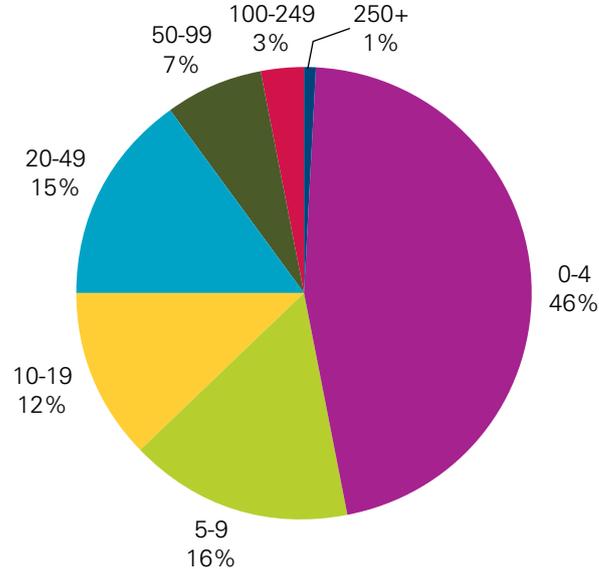
The distribution of companies in the medical technology sector according to turnover is shown in **Figure 10**. In 2013 approximately 41% of all companies in the sector had an annual turnover in the range £10,000-£0.5m compared to 42% in 2012. In 2013 there were 115 additional companies with a turnover in the £0.1m-£0.5m band compared to 2012 data. The number of companies with turnover in excess of £5m per annum has increased by 5% when compared with 2012 data and by 28% when compared to 2009 data.

Figure 10. *Distribution of medical technology companies by turnover*



The distribution of companies in the medical technology sector according to number of employees is shown in **Figure 11**. Only 35 companies representing 1% of the total companies in the sector employed more than 250 people. The remaining 99% are SMEs of which 2,113 (62%) have micro status (employ 10 people or fewer) and a further 12% employ between 10 and 20 people.

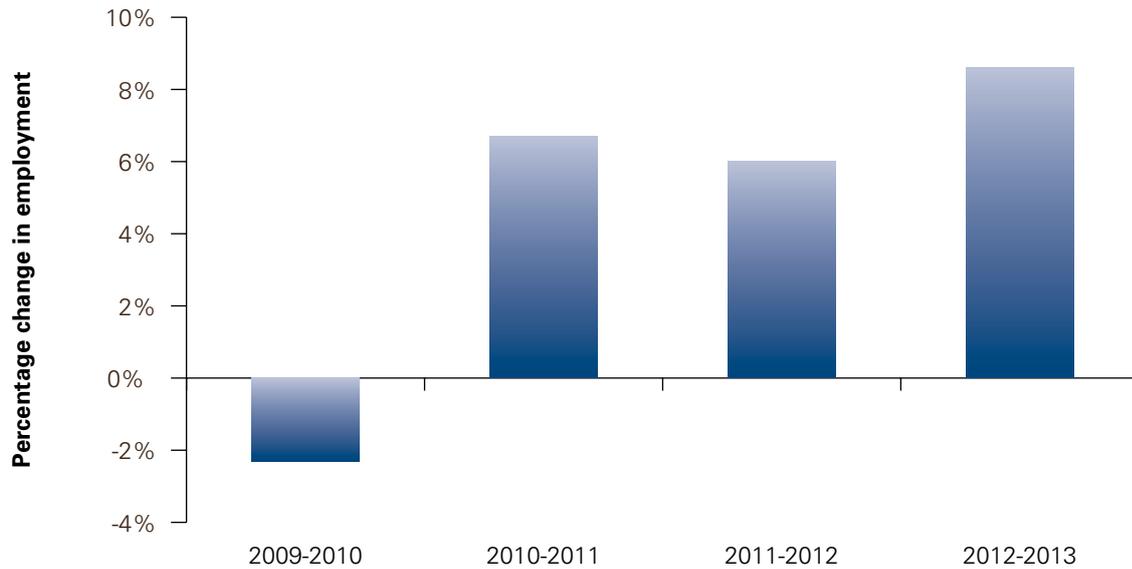
Figure 11. *Distribution of medical technology companies by employee numbers*



2.4. Trends – Turnover and Employment

A sample of 1,761 medical technology companies was used to track changes in the sector employment and turnover levels on an annual basis³⁴. Analysis of percentage change of employment numbers is shown in **Figure 12** and indicates that, following an initial drop of 2.3% in 2009-2010 there has been consistent year on year growth in employment across the sector with 2012-2013 showing the highest growth of 8.6% since recording started.

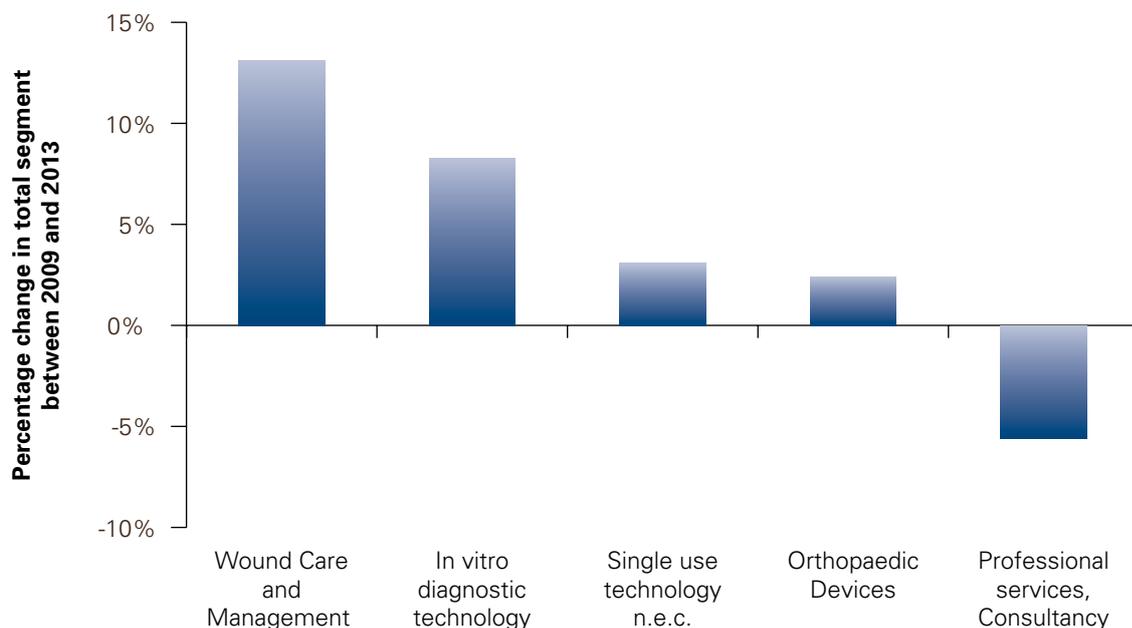
Figure 12. *Percentage change in employment for medical technology sector 2009-2013*



Growth in turnover for each of the five largest segments has been analysed and shown in **Figure 13**. Companies in wound care management recorded the strongest growth over 2009 to 2013 at 13.1% to achieve a total turnover of £1.45bn. In vitro diagnostic technology was the second highest growing segment over the same period increasing at 8% to a turnover of £1.2bn in 2013.

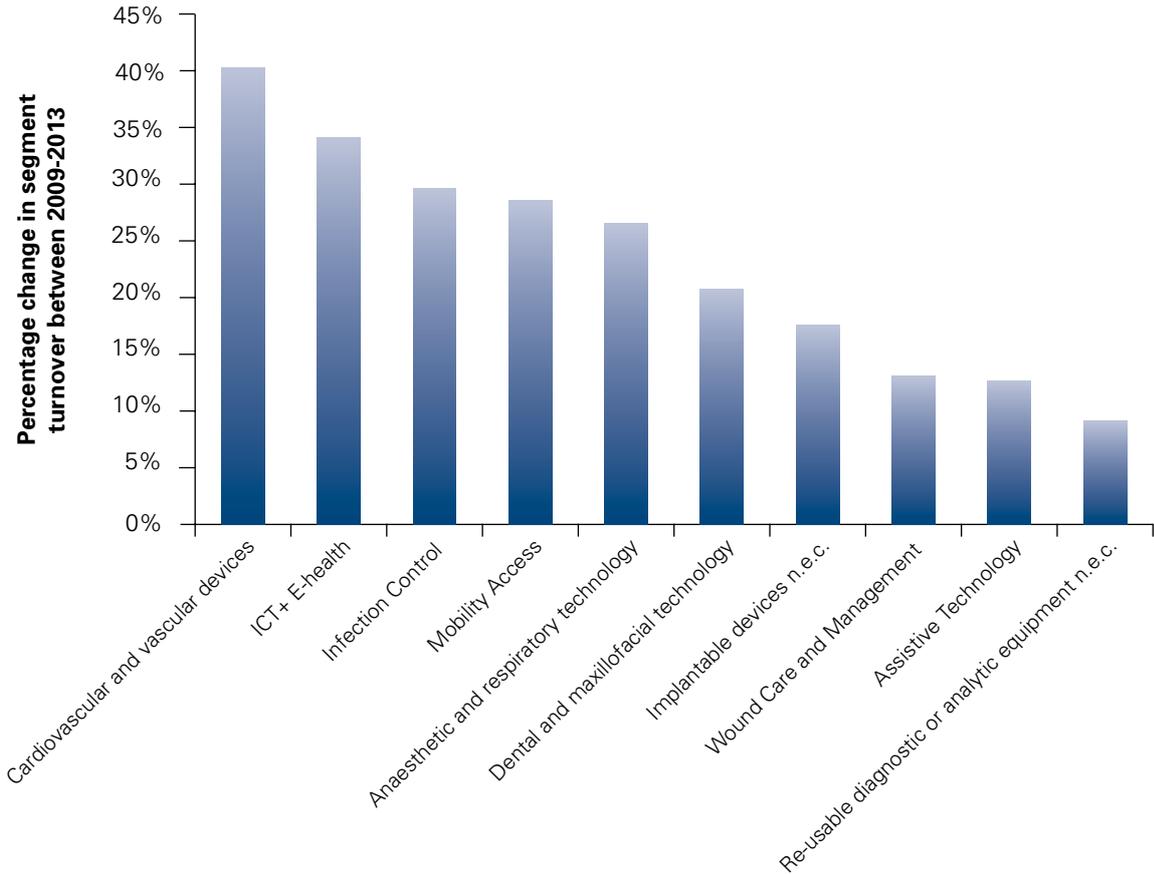
From the database, other top performing segments in 2013 showing positive growth rates were single use technologies and orthopaedic devices at 3% and 2% respectively. Professional services including consultancy recorded a drop in revenue of 6% despite being the largest segment overall.

Figure 13. *Percentage change in turnover from 2009 to 2013 for the Top 6 medical technology segments (base on turnover turnover)*



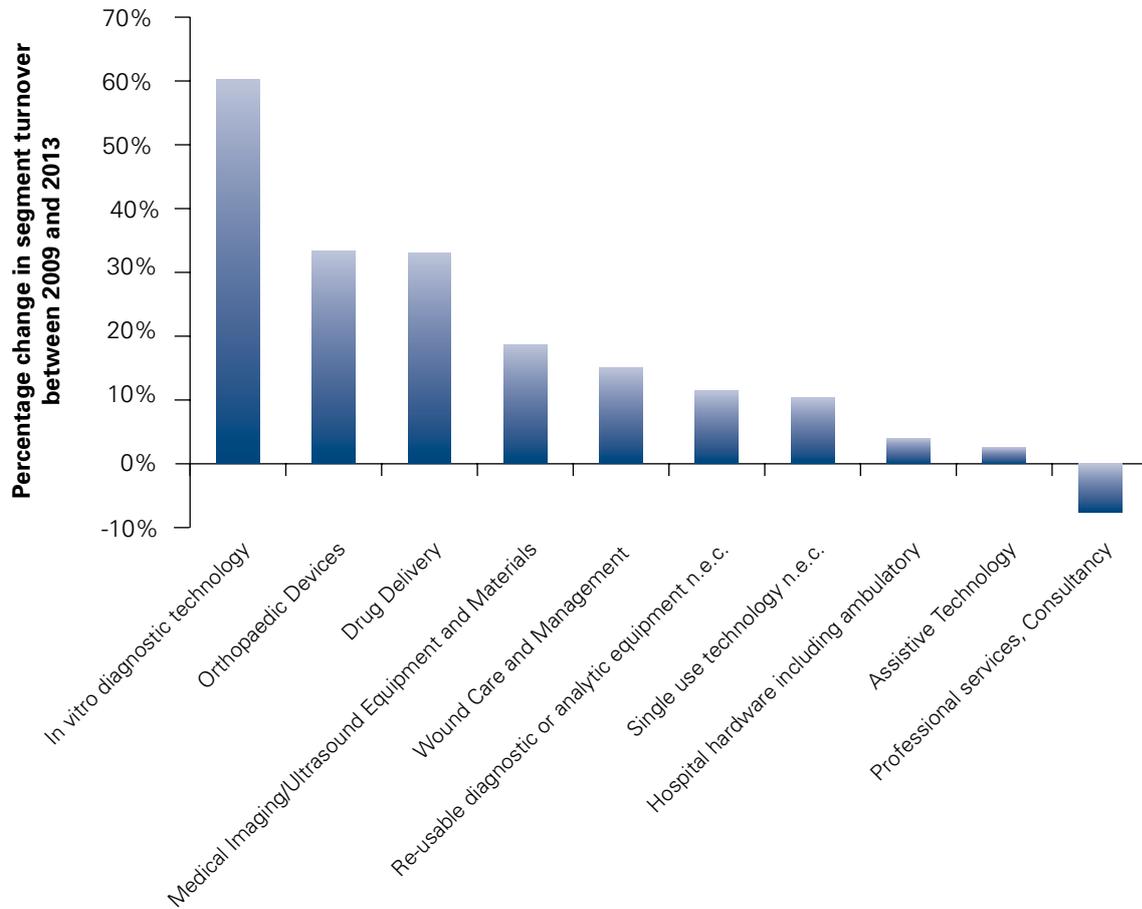
The fastest growing segments based on turnover are shown in **Figure 14**. Cardiovascular and vascular devices was the fastest growing segment with a 40% increase in turnover in between 2009 and 2013. The remainder of the top performing segments showed percentage increases ranging from 9% to 34%. It is worth noting that of the top five largest segments in the database only the wound care and management segment is in the top 10 fastest growing segments.

Figure 14. The Top 10 fastest growing medical technology segments based on increase in turnover between 2009 and 2013



The trend in employment by the top ten segments was analysed for the period 2009-2013 as shown in **Figure 15**. Employment increased across nine of the top ten segments with growth ranging from 3-60%. The professional services and consultancy segment was the only segment to show a small decrease of 8%. The *in vitro* diagnostics technology segment saw a 60% increase in employment reaching 6,700 employed in 2013. Drug delivery and orthopaedic devices followed this with each delivering 33% growth over this period. Segments showing little change were assistive technology and hospital hardware which together account for 11% of the total sector employment.

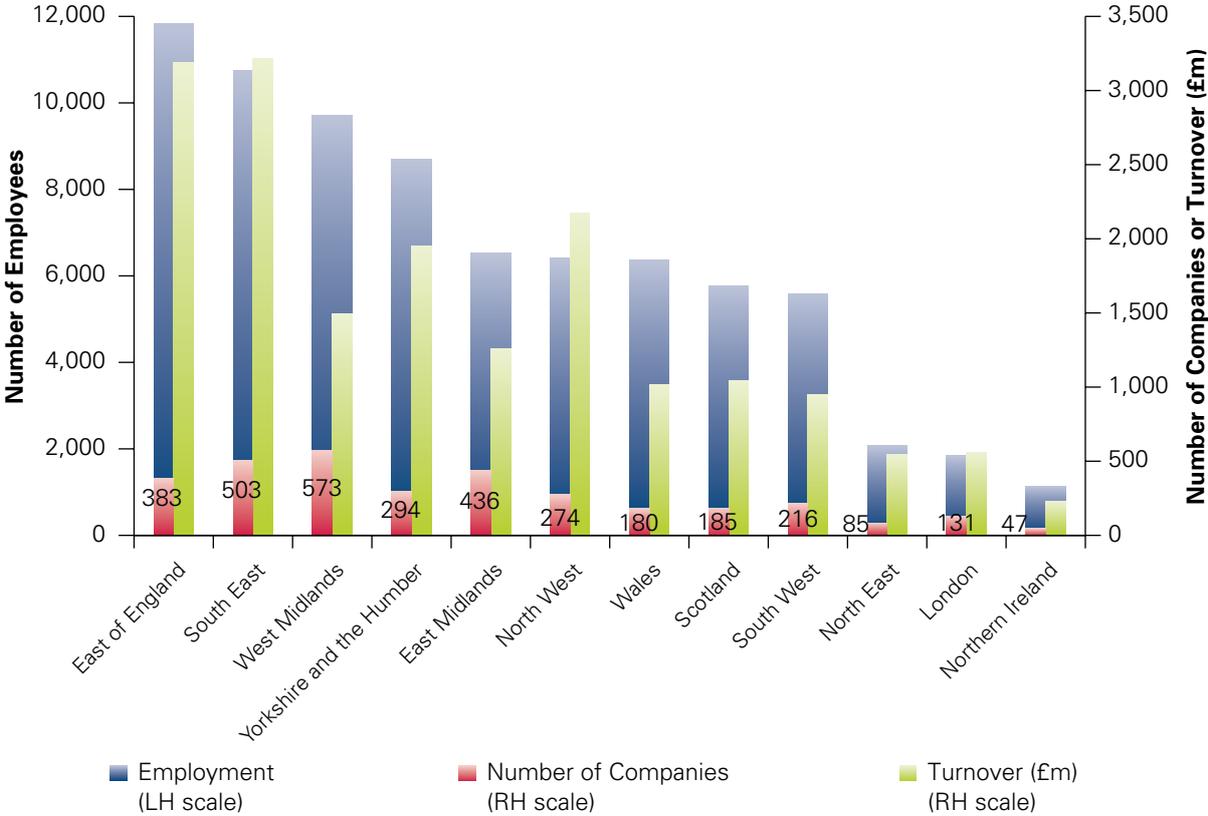
Figure 15. Percentage change in employment from 2009 to 2013 for the Top 10 medical technology segments defined by turnover



2.5. UK Profile

The geographical distribution for all 3,309 medical technology companies in the database including their turnover and employment is shown in **Figure 16**. Further analysis shows the company distribution according to the various regions across the UK and highlights those with relatively greater concentrations of companies. The West Midlands contains the largest number of medical technology companies in the UK with 573 companies, representing over 17% of the total.

Figure 16. Distribution of companies, turnover and employment across the UK for the Medical Technology sector

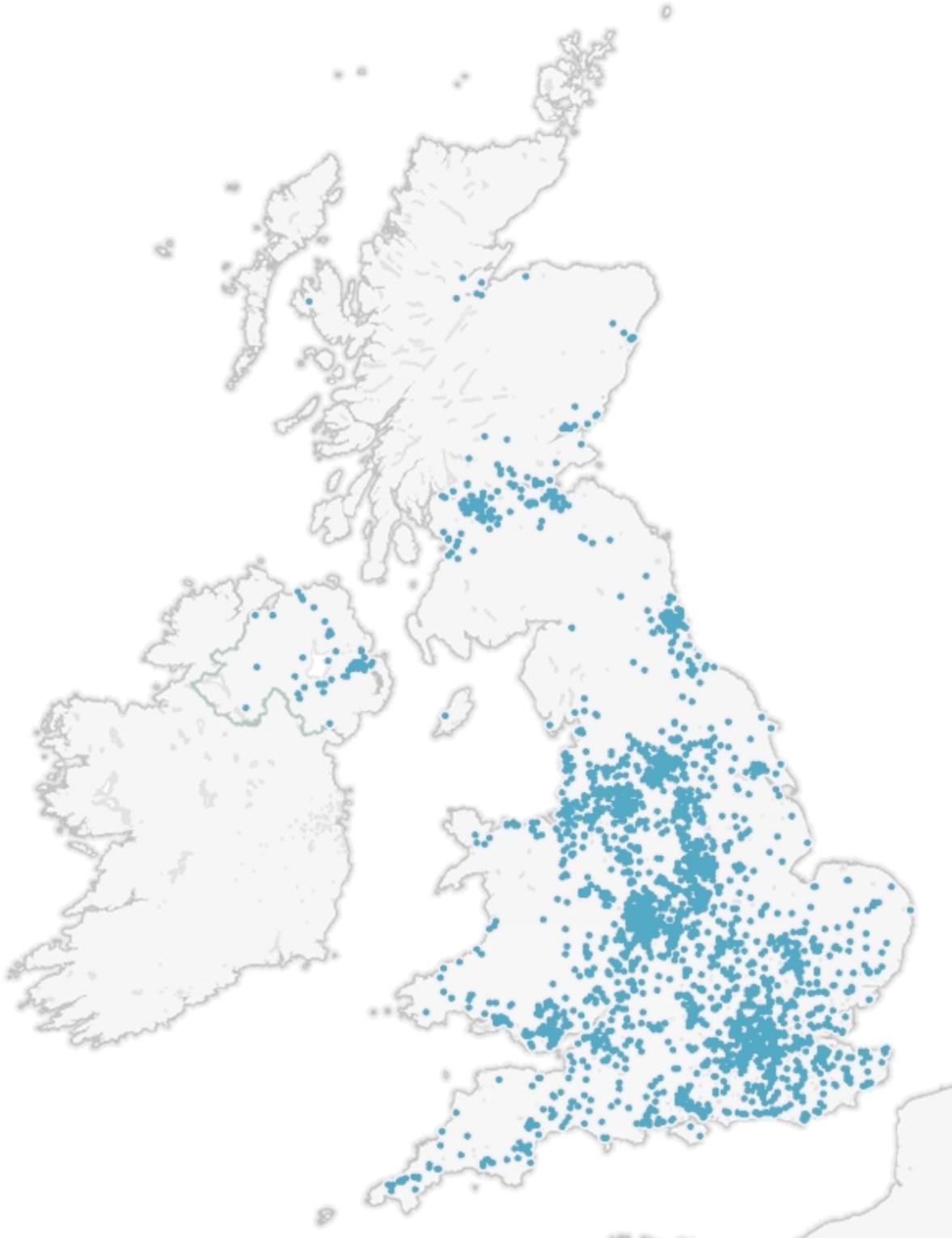


If the areas are grouped into larger geographical regions then 30% of all medical technology companies are located in the East and West Midlands while a further 27% are found in East and Southeast of England. The North of England (taken as North East, North West and Yorkshire and Humber) accounts for a further 20% leaving the remaining 21% distributed in Scotland, Wales, Northern Ireland and the South West.

Total employment by the medical technology sector in 2013 was 76,700. **Figure 16** shows that the top four regions as the East of England, South East, West Midlands and Yorkshire and Humber which contribute to 53% of the total. Companies in the East of England had the highest employment with over 15% of all UK medical technology employees, representing an average of 31 employees per company.

Total turnover by the medical technology sector in 2013 was £17.6bn. The East of England, South East, East and West Midlands, Yorkshire and Humber and the North West together contribute 75% to the total turnover for the sector. In the top two regions based on turnover, the average turnover per company was £6.2m and £8.3m for the South East and East of England respectively. By contrast companies in the East and West Midlands contributed 16% to the total turnover and had average turnovers of £2.8m per company.

2.6. Geographical Distribution of Medical Technology Companies



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Medical Biotechnology Sector

3.1. Sector Definition

The definition of medical biotechnology companies includes small to medium sized companies (typically with annual global revenues of less than £640m or approximately \$1bn) discovering or developing new therapeutics that achieve their principal action in or on the human body by pharmacological, immunological or metabolic means. Also included are companies who derive the majority of their revenue from products and services that they supply to other companies in the sector (i.e. supply chain).

3.2. Sector Overview

- The medical biotechnology sector consists 1,073 companies generating a turnover of £4.2bn and employing 26,900 people.
- Around 360 companies or one third of the total are active in R&D.
- The largest segments are drug discovery and development companies involved in antibody and small molecule technologies.
- The specialist supplier segment that provides products and services to both the pharmaceutical and medical biotechnology sectors consists of 903 companies with a combined turnover of £4.2bn and employs 23,350 people.
- The top 50 specialist suppliers include a high proportion of contract research and manufacturing companies and account for 76% of all specialist supplier employment.
- The majority of companies in the sector are SMEs and 48% of companies are less than 10 years old.
- Over the period 2009-2013 the medical biotechnology sector achieved a 22% positive trend in turnover growth with strong performance in the small molecule segment.
- Over the same period there was a trend of decreasing employment of 3.1%.
- Economic activity is concentrated in the South and East of England with other significant concentrations in Scotland, Wales and the North West of England.

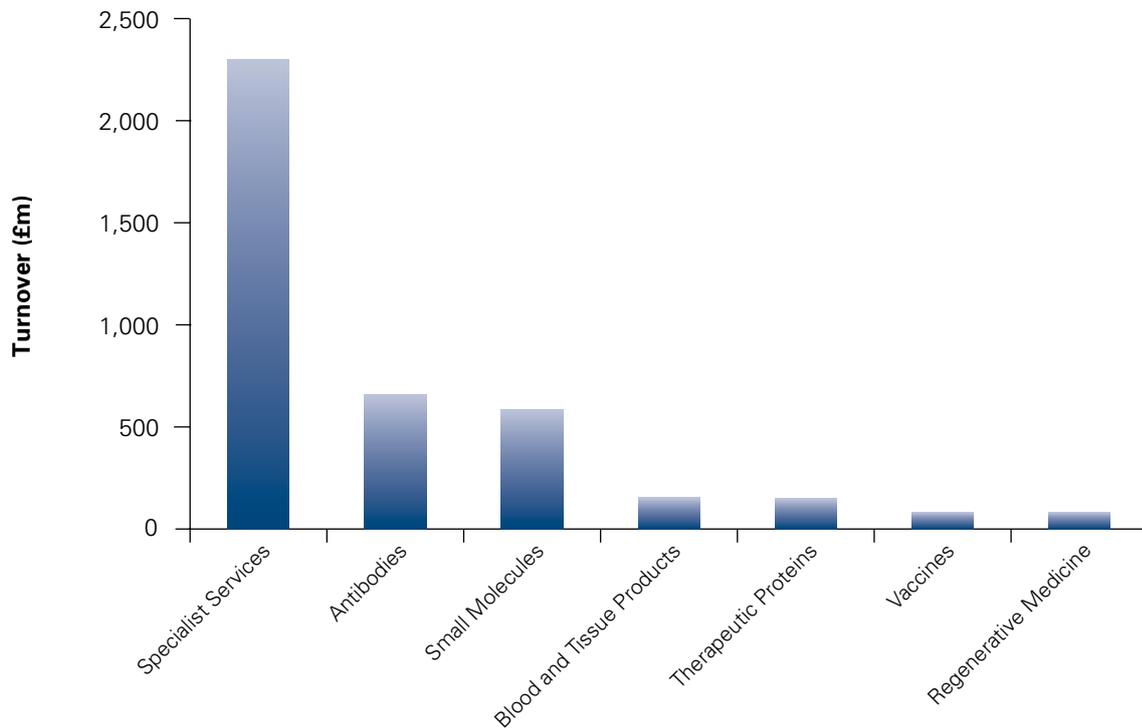
3.3. Turnover and Employment

Using information from the database, there are 1,073 medical biotechnology companies in the UK. Of those, approximately one third are involved in the discovery and development of new drugs based on biotechnology, and the remainder is in the supply chain. The overall sector generated a turnover of £4.2bn in 2012 and employed 26,900 people. The largest segment by turnover and employment contains companies providing specialist services, equipment and materials to the

sector. **Figure 17** shows the turnover by segment and highlights the importance of the specialist service sector. Most companies in the services sector supply both the medical biotechnology and pharmaceutical sectors.

Next to the specialist suppliers segment, the two largest segments contain companies that are engaged in discovery and development of new drugs based on antibody and small molecule technology. These segments have turnovers of £660m and £590m respectively. The antibody segment has been promoted to second place compared with 2012 by the addition of one company that was not previously included.

Figure 17. *Turnover by segment for the Medical Biotechnology Sector*



The distribution of employment across the medical biotechnology segments is similar to that for turnover, however the distribution of the number of companies per segment shows higher number of regenerative medicine and therapeutic protein companies than companies involved in antibodies. The lower average turnover and employment per company for regenerative medicine and therapeutic protein companies may indicate that these companies and segments are earlier in their development. **Figures 18 and 19** show the distribution of employment and number of companies per segment.

Figure 18. Number of employees per segment for the Medical Biotechnology sector

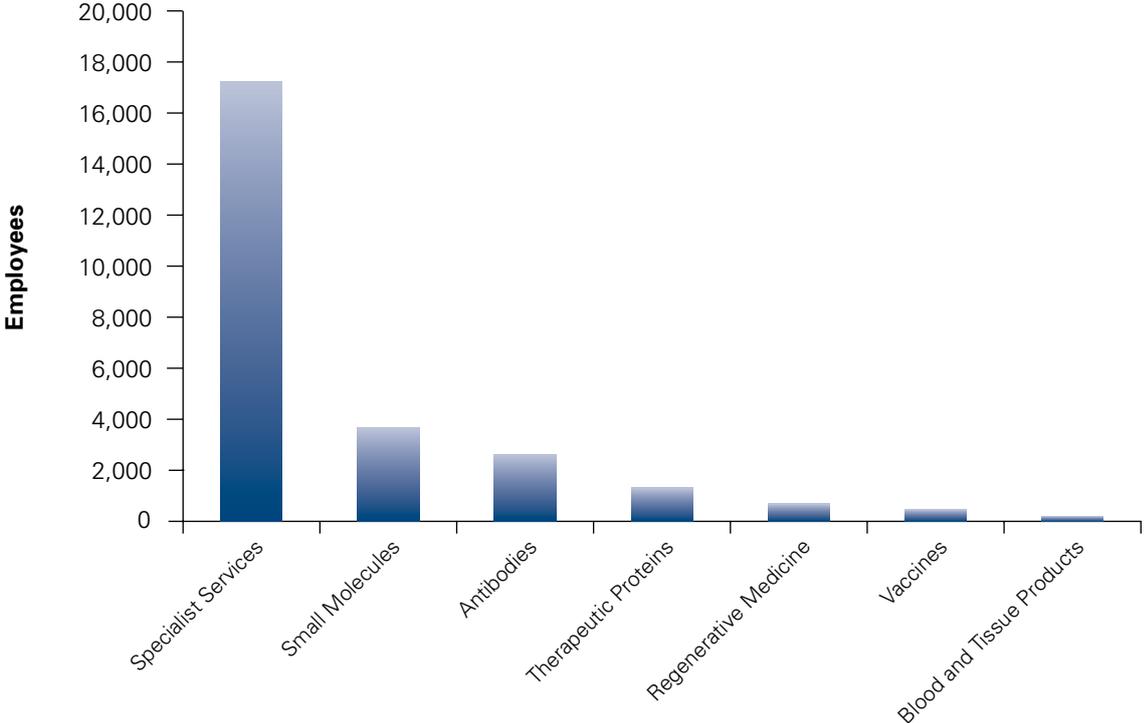
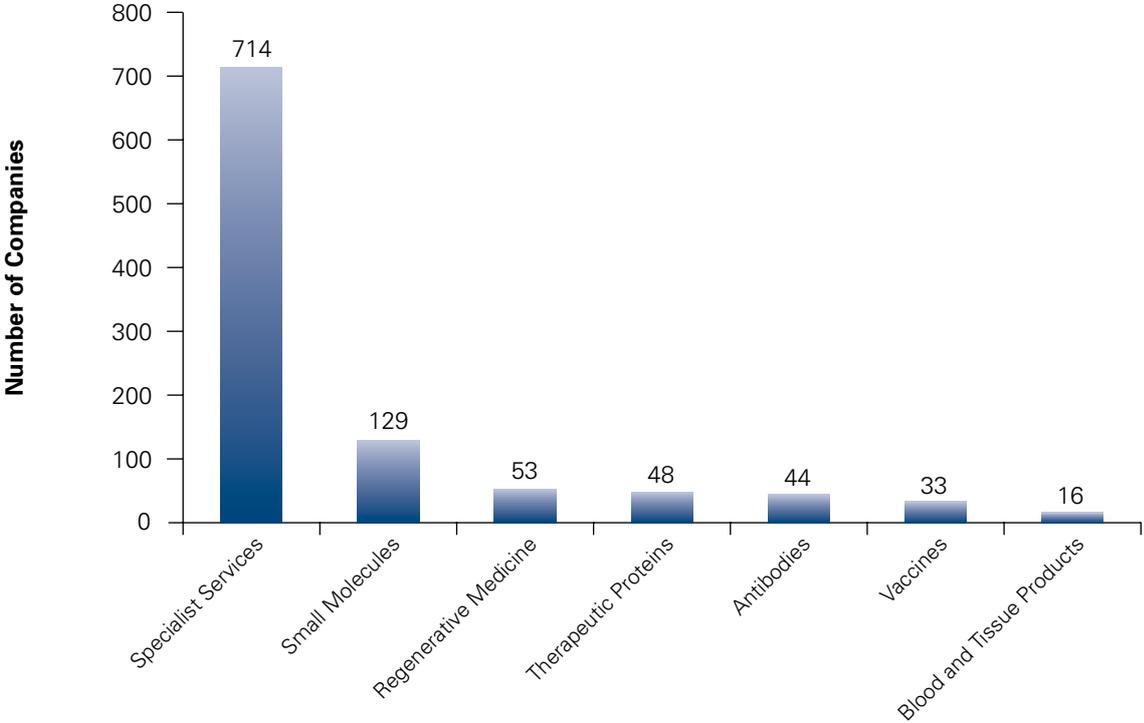


Figure 19. Number of companies per segment for the Medical Biotechnology sector

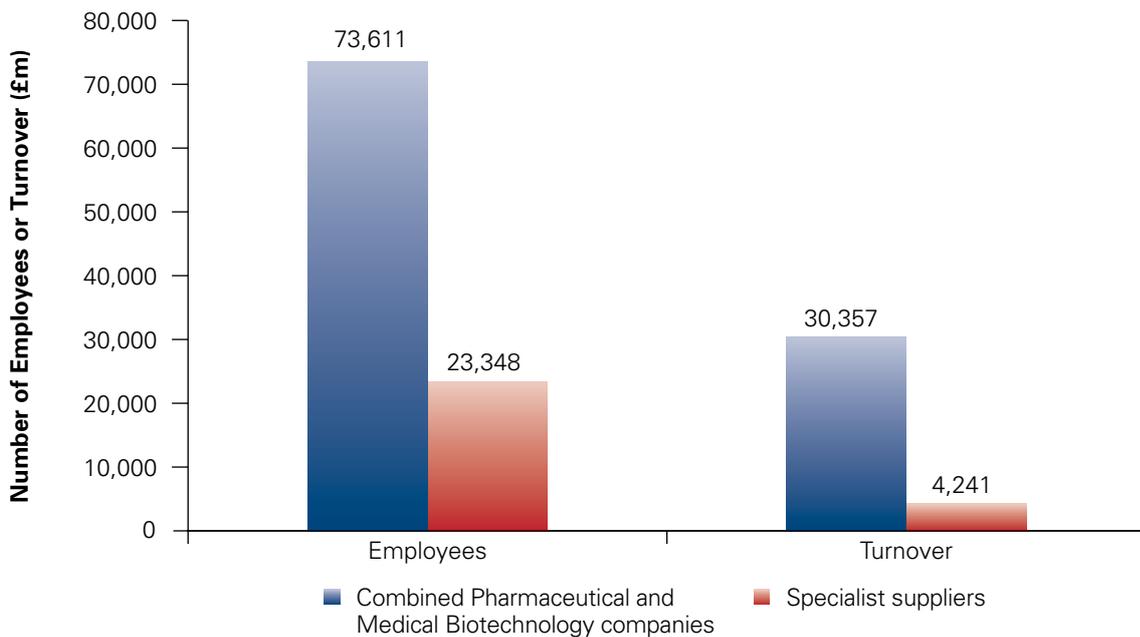


The importance of the specialist services and suppliers section to the overall medical biotechnology sector is clear from the data. This is unsurprising given the trend in out-sourcing begun by traditional pharmaceutical companies over 10 years ago and lean-start-up models adopted by most medical biotechnology companies.

Further examination of the specialist supplier segment reveals significant overlap of products and services with those provided by companies that serve the pharmaceutical sector. It is legitimate to view the specialist supplier segment for the pharmaceutical and medical biotechnology sectors as one given the similarity in products and services. In total the “outsourcing” segment in the UK contains 903 companies with a total turnover of £4.2bn and employing 23,350 people. These companies provide a range of outsourcing services ranging from clinical trials management, contract manufacturing and formulation, assay development and discovery services, good manufacturing and laboratory practice equipment, facilities and regulatory services.

Figure 20 compares the turnover and employment of the combined 885 companies in the specialist supplier segment in the database to the 647 companies involved in the discovery, development and selling of drugs for the combined medical biotechnology and pharmaceuticals sectors. This strong specialist sector or supply chain contains a number of global companies who not only serve UK companies but export their services around the world. The top 50 specialist suppliers account for 76% and 55% of all employment and turnover in the supply chain.

Figure 20. *Turnover and Employment for the Pharmaceutical and Medical Biotechnology sector compared to the totals for supply chain companies*



The turnover and employment profile of the medical biotechnology sector is shown in **Figures 21 and 22**. The profile shows 85% of companies with a turnover of less than £5m and 98% of the companies with fewer than 250 employees. Young companies characterise the sector 48% of the companies in the sector are less than 10 years old compared with 33% in the pharmaceutical sector. A significant proportion of the companies are likely to be pre-revenue and investing in the discovery and development phases of drug development prior to launch.

Figure 21. *Distribution of Medical Biotechnology companies by turnover*

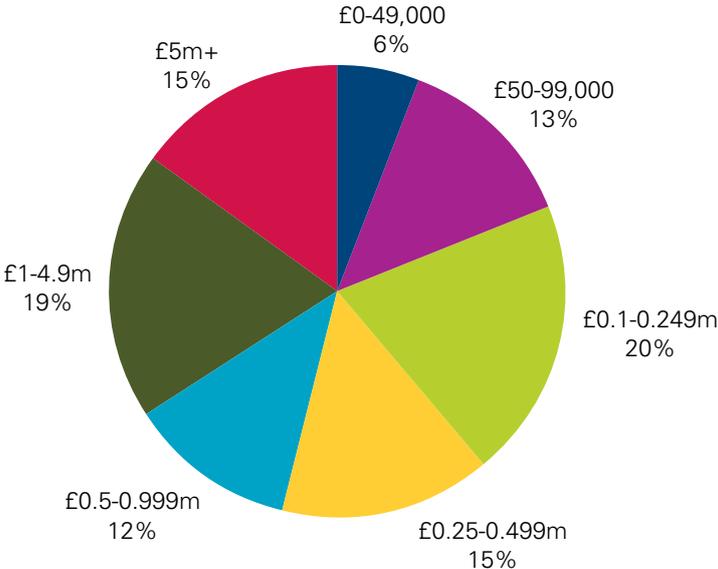
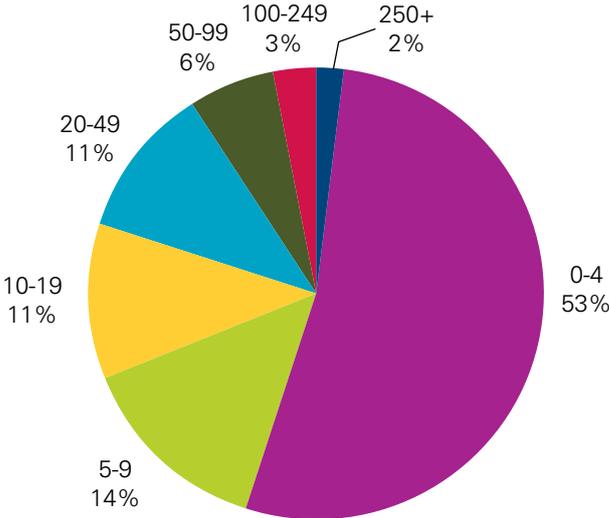


Figure 22. *Distribution of Medical Biotechnology companies by employee numbers*



3.4. Trends – Turnover and Employment

Over the period 2009-2013 the sector has shown an increase in turnover of 22%, with the core segments containing discovery and development companies and excluding supply chain activity posting a 16% increase over the same period. Strong turnover growth was shown by both the small molecule and specialist suppliers segments.

The data set of 380 companies used to measure trends is active across all segments of the medical biotechnology sector and collectively accounts for 60% of both sector turnover and employment.

Figure 23 shows the trend in turnover for individual segments. This illustrates the strong overall growth in the small molecule segment over 2009-2012 but a decrease over 2012-2013. The specialist suppliers segment grew 25% over this period as did

the blood and tissue segment, albeit for the latter from a small base in 2009. All other segments saw a decline in turnover, except for vaccines that saw a more than doubling, albeit from a small base. However, as discussed above given that a number of companies are pre-revenue and the data does not include expenditure on R&D, these declining revenues do not necessarily reflect declining prospects for the sector.

Figure 23. Turnover by segment over 2009-2013 for the Medical Biotechnology sector

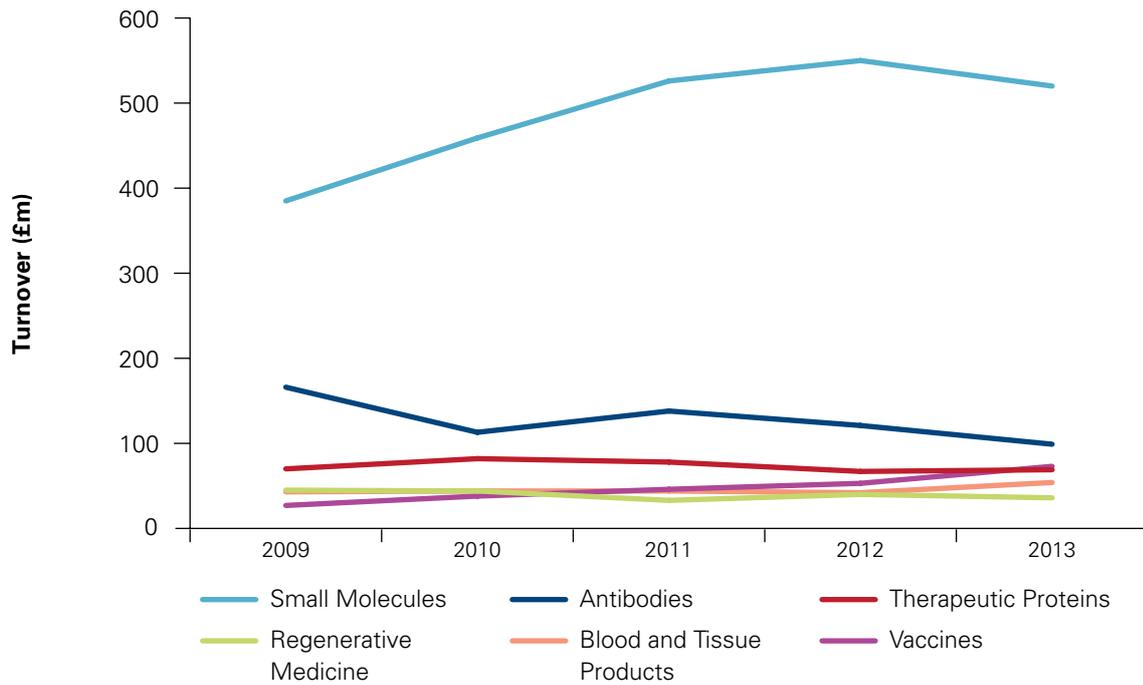
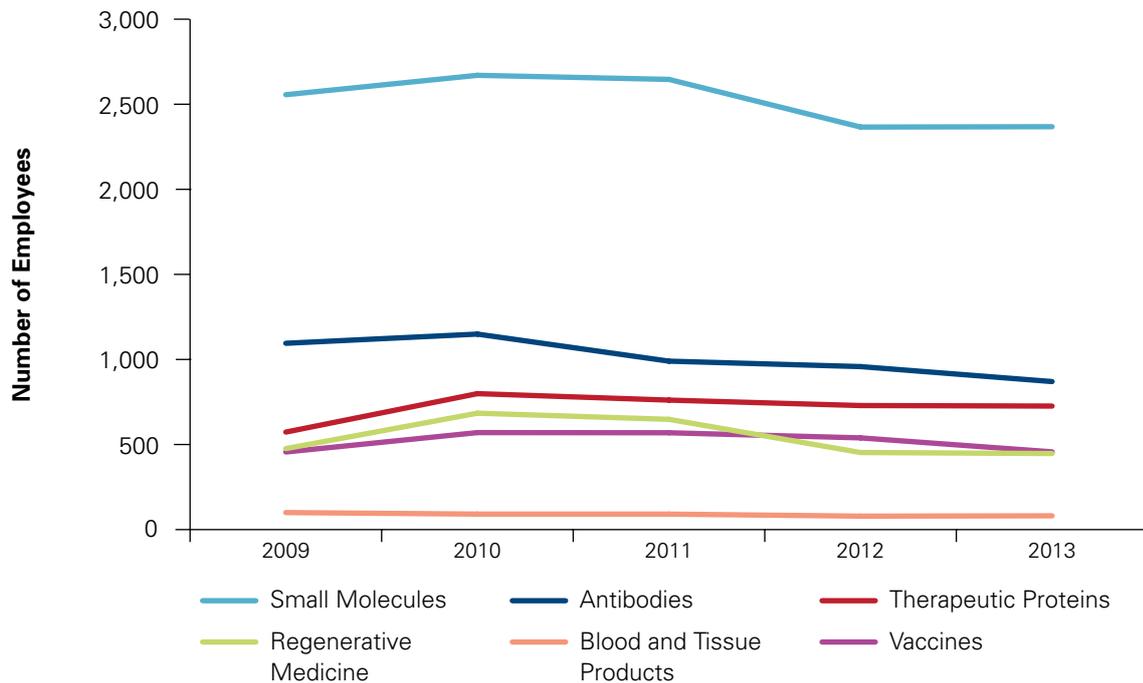


Figure 24 shows the employment by segment over the period 2009-2013. The total sector employment showed a trend of falling employment of 3.1% over this period with the greatest decreases seen in the antibody segment and small molecules. Specialist suppliers showed a small positive trend of 0.5% growth.

Figure 24. Employment by segment over 2009-2013 for the Medical Biotechnology sector



3.5. UK Profile

The geographical distribution of companies, turnover and employment is shown in **Figure 25**. The East and Southeast of England have significant levels of employment and turnover compared with other areas. When London is also included, these areas account for around 50% of all medical biotechnology companies and associated employment and turnover. Other significant concentrations of economic activity in the sector are seen in the North West of England, Scotland and Wales.

Data collected on activity at individual site locations indicates that the East of England, Southeast of England and London have the largest number of sites designated as containing R&D activities, followed by Scotland and the North West of England. The distribution of sites designated as having manufacturing activity appears to be spread more widely across the UK.

The importance of the specialist supplier segment as part of the pharmaceutical and medical biotechnology landscape has been discussed above and **Figure 26** shows the distribution of employment in the sector across the UK. Given the concentration of pharmaceutical and medical biotechnology companies in the Southeast and East of England it is not surprising to see a significant proportion of the specialist supplier employment is also concentrated in these two areas. However, interestingly, Scotland and areas such as the East Midlands also have high concentrations of employment suggesting that the location of specialist suppliers may not be solely determined by proximity to the largest clusters of medical biotechnology customers.

Figure 25. Distribution of companies, turnover and employment across the UK for the Medical Biotechnology sector

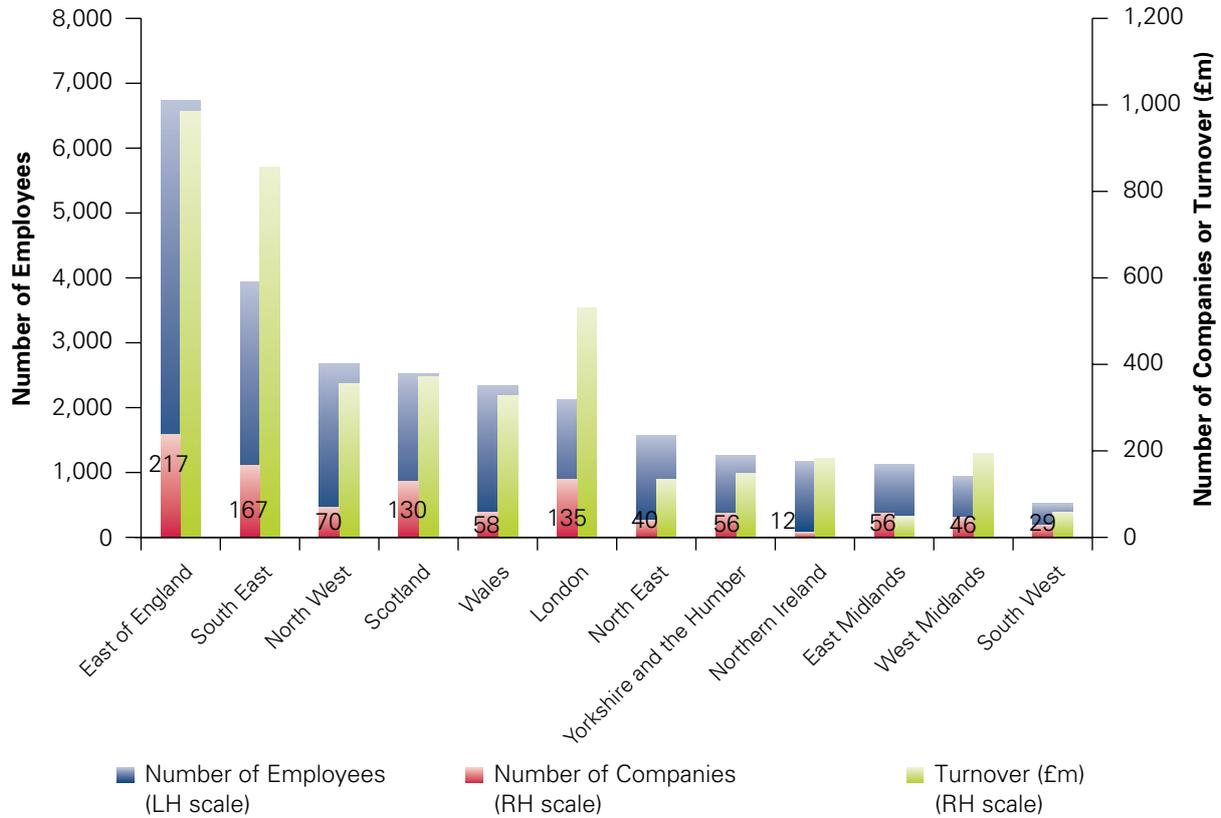
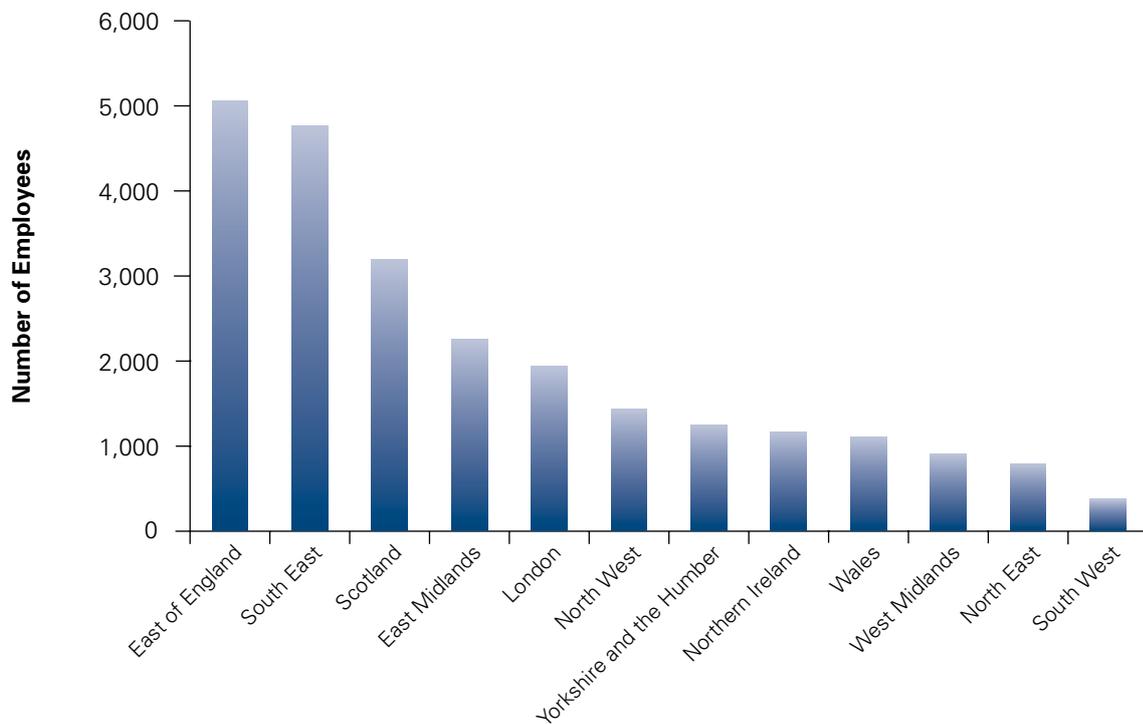


Figure 26. Distribution of Employment across the UK for the Specialist supply and service companies



3.6. Geographical Distribution of Medical Biotechnology companies



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Industrial Biotechnology Sector

4.1. Sector Definition

The definition of the industrial biotechnology sector used in this report refers to companies whose main 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 feedstock to make industrial products. As in the other sectors, companies using biotechnology to make products or services that amount to only a minority of their turnover are excluded from this analysis. Thus the database focuses on those companies that develop the key technologies that underpin the UK industrial bio-economy. These technologies include fermentation and biotransformation, as well as downstream processing (product purification and separation) and technologies based on biomass production.

This definition of industrial biotechnology used to scope companies for inclusion in the database will not capture all of the industrial output generated from the application of this growing technology area. Companies that apply industrial biotechnology in a multi-stage operation to produce one or more existing products that make up a minority of their total turnover are not included in this analysis. Hence the value of pharmaceutical end products such as antibiotics or therapeutic proteins is excluded, but the value associated with companies that produce catalysts or organisms used as a reagent for the production of such products is included.

4.2. Sector Overview

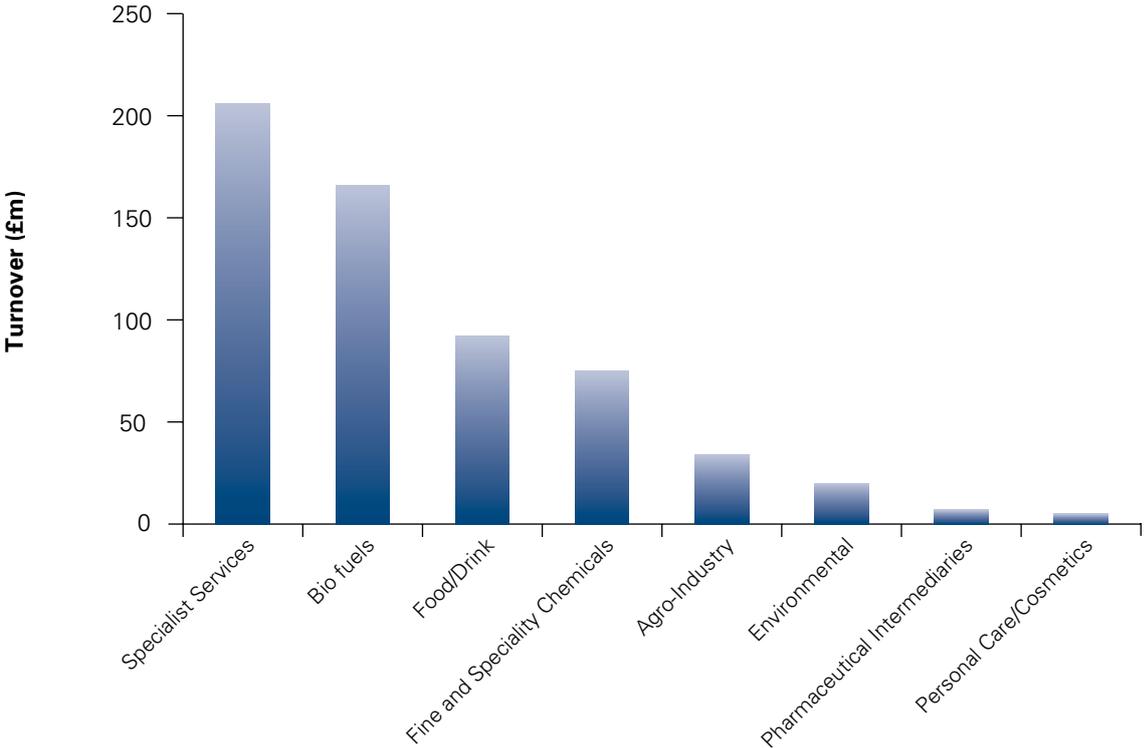
- The industrial biotechnology sector consists of core group of 121 companies that generate £600m in turnover.
- The sector employs 1800 people and employment has shown a trend of 5% CAGR growth over the last 5 years.
- The biofuels segment along with specialist services and companies providing products into the food & drink sector are the largest in terms of turnover and employment.
- The specialist services segment is composed of a range of suppliers of reagents, equipment, engineering services and specialist advice. The largest companies in this segment are those that supply enzymes and enzyme technology.
- The sector exhibits the profile of an emerging sector with most companies classified as SMEs with <250 employees.
- Over the period 2009-2013 the group of companies in the sector that represent >75% of all turnover and employment have shown positive increases in both measures, with turnover increasing 53%. The strongest growth was in the biofuels and specialist services segments.
- The distribution of industrial biotechnology activity across the UK shows limited evidence of concentration probably demonstrating the emerging nature of the sector.

4.3. Turnover and Employment

The industrial biotechnology sector in the UK consists of 121 companies that generate a turnover of £605m and employ 1,790 people. The addition of companies to the dataset from the 2013 update included 45 companies that have existed for more than 12-18 months and had not been previously identified. These additional companies were mainly in the food and drink and specialist services segments.

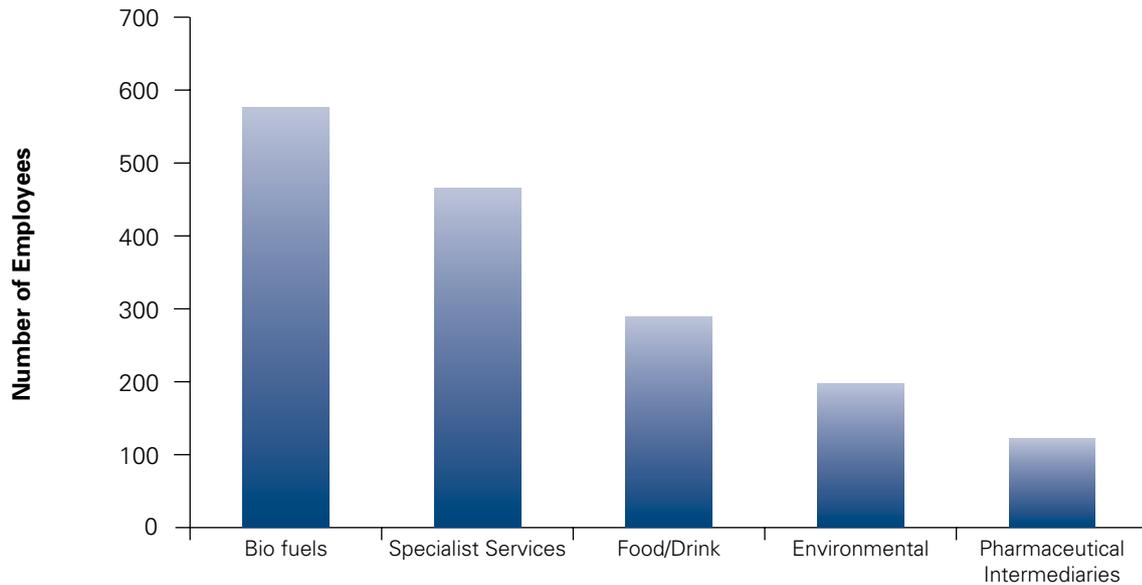
Figure 27 shows the turnover for the major segments in the industrial biotechnology sector. The largest segment in terms of turnover is the specialist services segment with just over £200m of turnover based on providing services, equipment and materials into the sector in the UK and overseas. The largest group of companies in the specialist suppliers segment supply enzymes and enzyme technology. Together these companies represent 87% of the turnover but relatively low levels of employment, suggesting that the majority of the turnover is generated from trading activities rather than production or research. Compared to the 2012 report the segments that make up the top 3 now include Food and Drink. This is due to the addition of companies into this segments dataset, rather than intrinsic growth.

Figure 27. Turnover by segment for the Industrial Biotechnology Sector



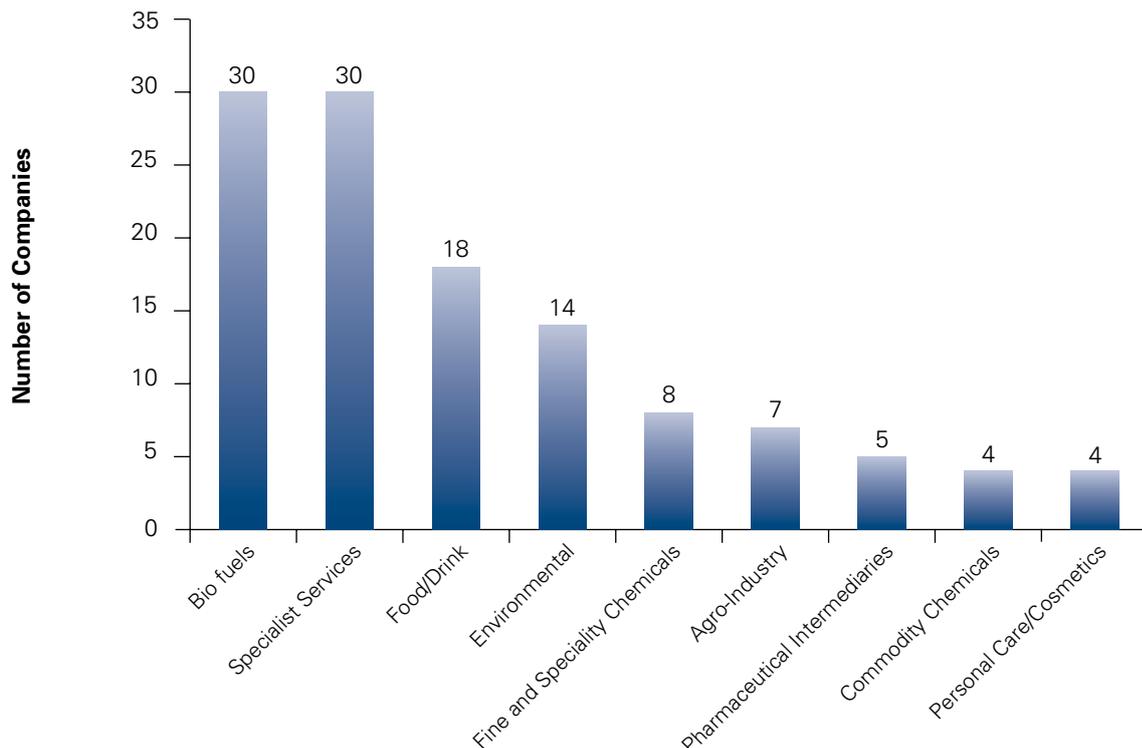
As shown in **Figure 28**, the top 3 segments in terms of employment are the same group as for turnover but the biofuels segment is the largest overall contributor to sector employment rather than the specialist services.

Figure 28. Number of employees for the major segments in Industrial Biotechnology sector (segments with >100 employees only shown)



As discussed above the scope definition for the sector includes only those companies who derive the majority of their income and employment from industrial biotechnology. Using this definition, the sector has only emerged over the last 10 years as a separate grouping of companies driven in part by the recognition of the potential of the technology to contribute to the achievement of sustainability targets. The data suggests that the sector in the UK is growing with the majority of companies active in the areas of biofuels and specialist services, particularly in the supply of enzymes, as shown in **Figure 29**.

Figure 29. Number of companies per segment for the Industrial Biotechnology sector



Figures 30 and 31 shows the distribution of companies by turnover and employment bands and supports the view that the sector is emerging as all companies are classified as SMEs (fewer than 250 employees) with only one company recorded in the range 100-249). Examining the data for turnover distribution by company in more detail reveals that of the 21 companies with turnovers greater than £5m, six have turnovers in the range £10-20m, six are in the range £20-100m and one has a turnover greater than £100m. Of the top five companies in terms of turnover two are suppliers of enzymes, two are biofuels companies and one is an integrated specialty chemical company.

Previous years analyses have examined the technologies employed by companies in the sector and highlighted that the most widely used technologies were biomass processing, fermentation and enzyme development. This analysis is consistent with the top segments being biofuels and enzyme companies.

Figure 30. *Distribution of Industrial Biotechnology companies by turnover*

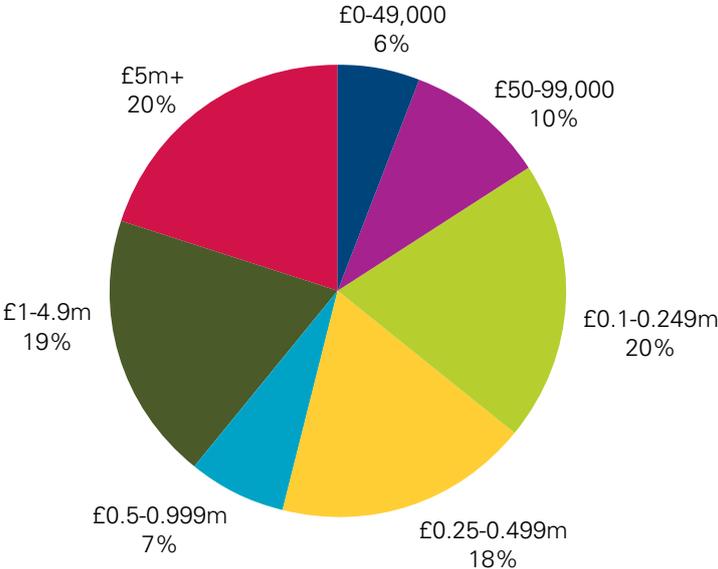
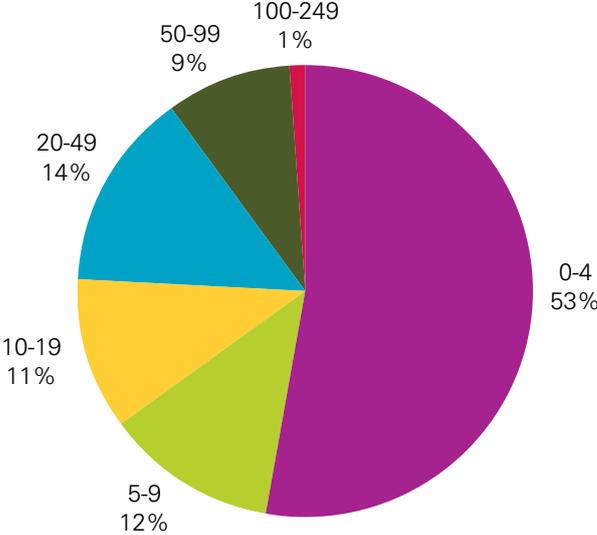


Figure 31. *Distribution of Industrial Biotechnology companies by employee numbers*

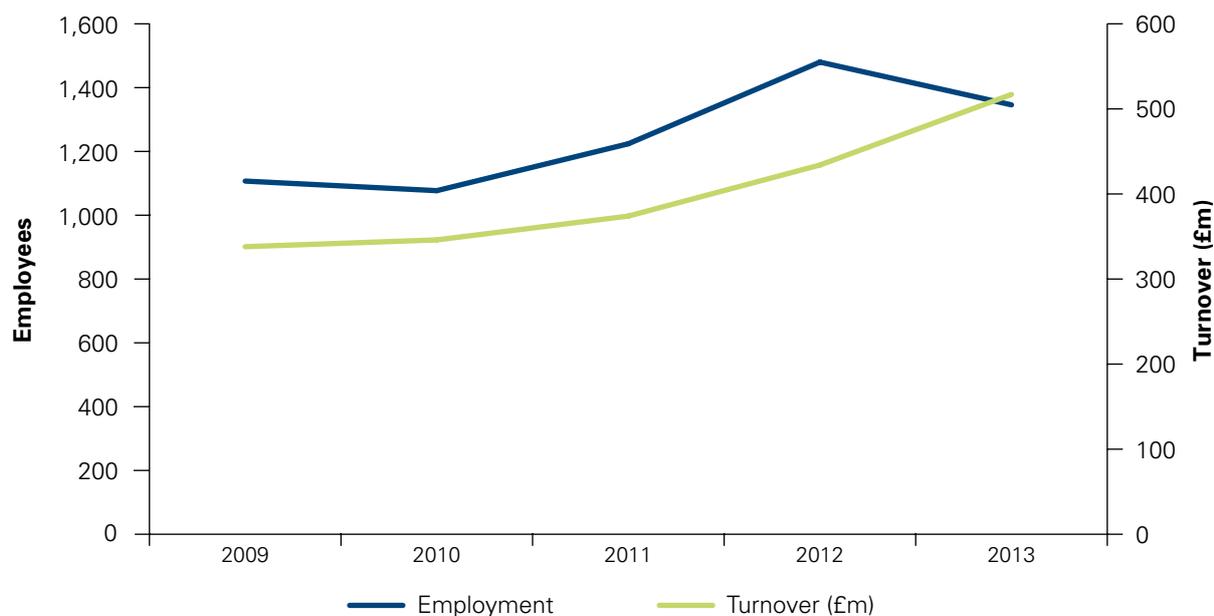


4.4. Trends – Turnover and Employment

The sixty-nine companies in this sector, that have been monitored since 2009 to give an estimate of trends in the sector, collectively account for 85% and 75% of the total sector turnover and employment respectively.

Figure 32 shows the turnover and employment for these companies over 2009-2013 and highlights a steady increase in turnover and employment over this period. The turnover has increased 53% since 2009 with the biofuels and specialist services segments showing the highest growth. The observed growth in the biofuels segment in the UK parallels the trend seen in the global market and a number of significant investments have been made in the biofuels production capacity across the UK. Over the same period, employment has grown 21% equivalent to a CAGR of 5% despite a small decrease in employment recorded in the last year (2012-2013). Again the biofuel and specialist services segments showed strong growth in employment.

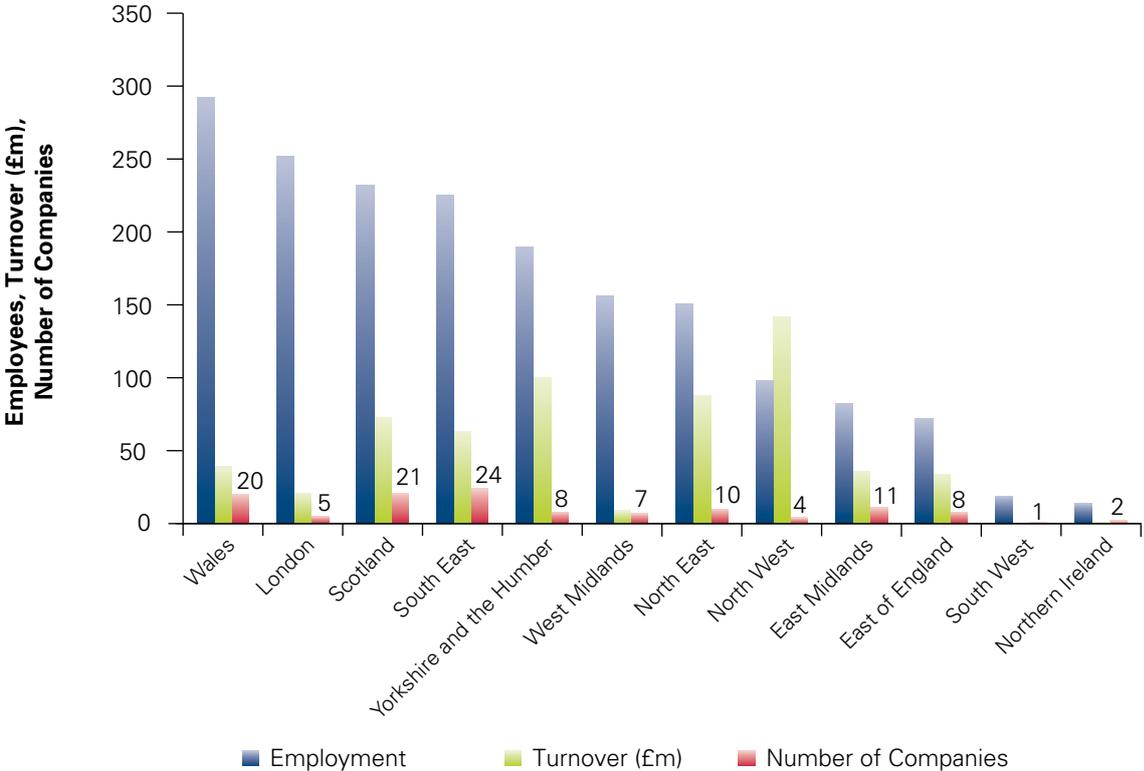
Figure 32. *Employment and turnover over 2009-2013 for the Industrial Biotechnology sector*



4.5. UK Profile

The regional distribution of employment, turnover and companies is shown in **Figure 33** and shows some contrasting patterns across the UK. For example, Wales has the highest level of employment but has relatively low numbers of companies and turnover compared with for example the North West of England. Examination of these two regions shows that in Wales 40 companies have an employee range of 1-60 and turnovers £0.1-7m (with one company with a turnover less than £10m), while the North West has one large company that generates 50% of the turnover in the region. The conclusion from a detailed analysis of the distribution data highlights that it is too early in the development of the sector to identify areas or clusters of activity.

Figure 33. Distribution of companies, turnover and employment across the UK for the Industrial Biotechnology sector



4.6. Geographical Distribution of Industrial Biotechnology companies



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Pharmaceutical Sector

5.1. Sector Definition

The pharmaceutical sector in the database consists of companies with a global turnover of more than £640m (or approximately \$1bn) whose major activity is the research and development of therapeutic products irrespective of the underlying technology involved. In addition companies who are contract manufacturers, contract service organisations, and pharmaceutical wholesalers are included in this sector.

5.2. Sector Overview

- The pharmaceutical sector generates a turnover of £29bn and employs 70,310 people.
- There are 477 companies in the sector and all of the Top 20 global pharmaceutical companies have activity in the UK.
- The global Top 20 companies account for 67% of the turnover and 57% of sector employment.
- There are 182 companies excluding the Top 20 involved in the discovery, development and production of pharmaceuticals employing 16,400 people or 23% of the total.
- The sector is supported by a network of 189 specialist supply companies providing clinical trials, manufacturing, equipment, and regulatory services and this segment employs 6,200 people.
- Over the period 2011-2013 a subset of 226 companies who together account for over 62% of sector employment reduced employment by 2.7%. This was driven by a large reduction in employment in the global Top 20 companies.
- The segment containing large to medium size pharmaceutical companies showed positive growth in turnover and employment over 2011-2013.
- The sector has a higher proportion of large companies than the national average with 15% of companies employing 250 or more
- While all areas of the UK have activity in the sector the South East and East of England along with London contain 60% of all employment.

5.3. Turnover and Employment

The pharmaceutical sector in the UK generates a turnover of £29bn, the majority of this from sales of medicines still under patent. These include sales to UK and overseas customers, with the industry a strong exporter generating a positive trade balance of over £5bn per annum for the last 5 years³⁵. All of the Top 20 global³⁶ pharmaceuticals companies, defined on the basis of global sales, record sales in their UK operations and these companies account for 67% of the turnover in the sector.

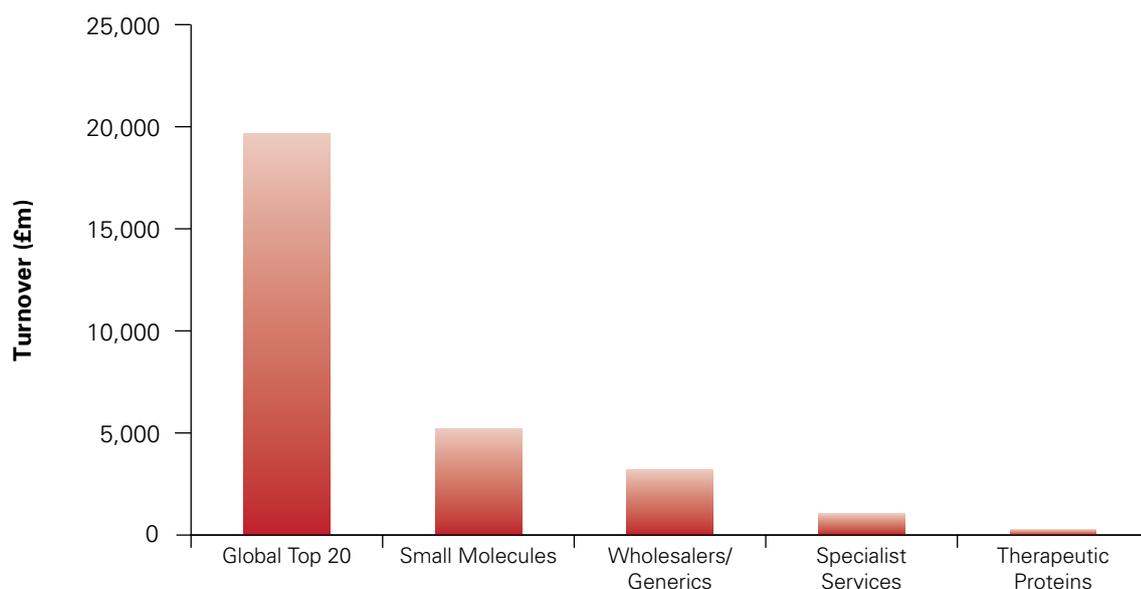
Within the top 100 global companies, 53 report sales from UK operations and contribute 71% to the total.

Figure 34 shows the turnover of the top 5 segments in the pharmaceutical sector showing the importance of the activities of the top 20 global companies. The small molecules segment contains pharmaceutical companies outside the top 20, including 33 companies that are ranked within the top global 21-100. A total of 182 companies are active in the development and manufacture of proprietary medicine, primarily based on chemistry.

The next largest segment in terms of turnover contains companies engaged in the manufacture and distribution of generic versions of pharmaceuticals or involved in the distribution of pharmaceuticals i.e. wholesalers. The traditional distinction between branded and generic pharmaceutical companies has blurred in recent years as generic companies have developed branded medicines and a number of large pharmaceutical companies have entered the generics market. Eight companies in the top 20 global generic drugs producers have sales in the UK.

The specialist supplier segment for pharmaceuticals contains clinical research organisations (CROs), contract manufacturing and packaging companies, suppliers of specialist reagents, regulatory expertise and clinical trials services. This is a key component of the pharmaceutical supply chain and is growing in importance. The outsourcing trend of large pharmaceutical companies began some 20 years ago and has accelerated over the last 10 years. This trend has created global CROs with many having extensive operations and turnover in the UK. As discussed in the section on Medical Biotechnology these specialist suppliers serve both the pharmaceutical and the medical biotechnology sectors and had a total turnover of £4.2bn and employ 23,000 people.

Figure 34. *Turnover of the top 5 segments in the Pharmaceutical sector*

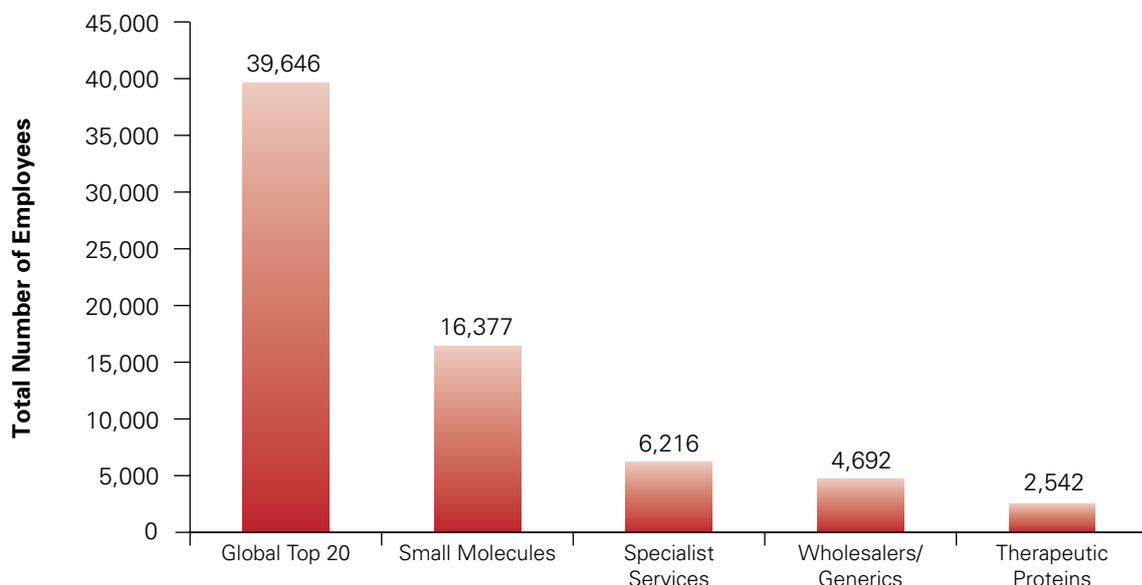


The therapeutic protein segment contains global companies not in the global Top 20 pharmaceutical companies that derive the majority of their UK sales from medicines that are proteins, typically based on the use of recombinant technology.

The pharmaceutical industry in the UK is a major employer of highly qualified and trained staff. In total, from the database, the industry employs 70,310 in 477 companies, with the Top 20 group of companies accounting for 57% of employment. The sector is a major employer of research and development staff with an estimated 23,000 people working on the discovery and clinical development of innovative medicines.

Figure 35 shows the number of employees per segment illustrating the continuing importance of the top 20 companies as employers in the sector. The small molecules sector is also a major employer containing a group of 182 medium sized companies involved in developing, manufacturing and selling medicines in the UK and overseas.

Figure 35. *Employees per top 5 segments in the Pharmaceutical sector*



Of the 477 companies in this sector in the database, the majority are small to medium pharmaceutical companies (small molecules) or specialist suppliers. **Figure 36** gives the full distribution of company numbers by segment. There are 14 companies active in the therapeutic and vaccines segments.

As expected, the global Top 20 have the highest averages of employers and turnover per company at approximately 2,000 employees and £1bn turnover per company respectively. Small and medium sized pharmaceutical companies had average of 90 employees per company closely followed by wholesalers and generic companies with 70.

Figures **37 and 38** give a more detailed breakdown of the turnover and employee bands for companies in the sector. These show that the sector has a higher proportion of the non-SME companies (fewer than 249 employees) than the national average; 15% compared to 1%, and in medium sized businesses (50-249

employees) at 18% versus a national average for all companies of 0.6%³⁷. Compared to the other life science sectors in the database, the pharmaceutical sector has a significantly larger proportion of companies with a turnover in excess of £5m – 51% compared with 15-20% for all the other sectors.

Figure 36. Number of companies by segment for the Pharmaceutical sector

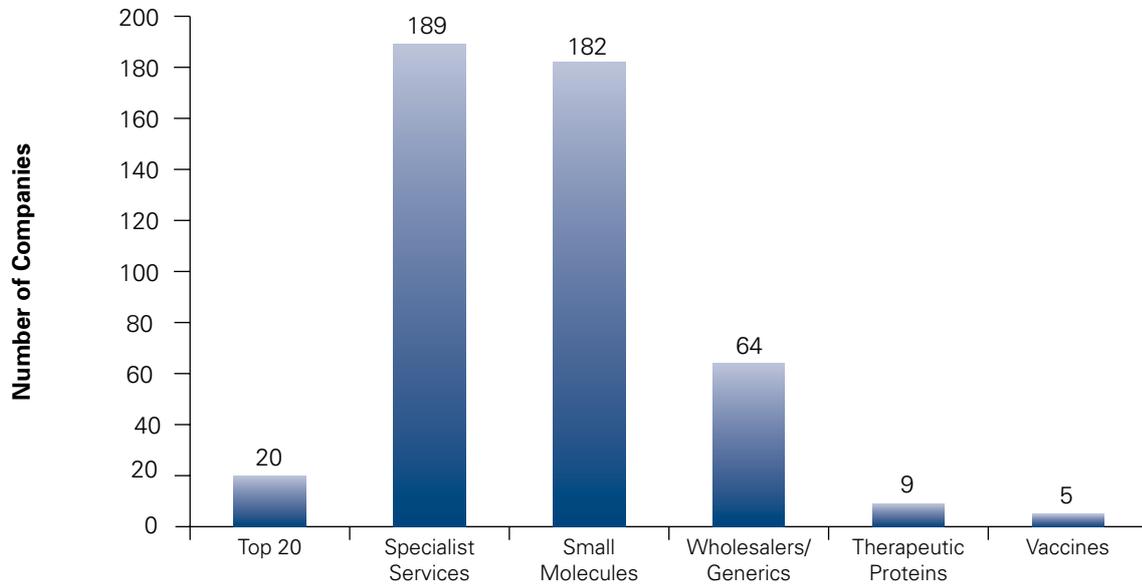


Figure 37. Distribution of Pharmaceutical companies by turnover

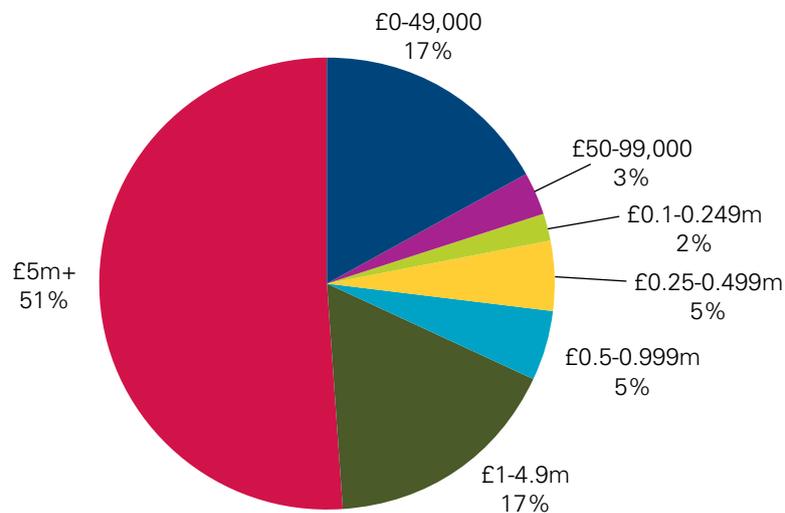
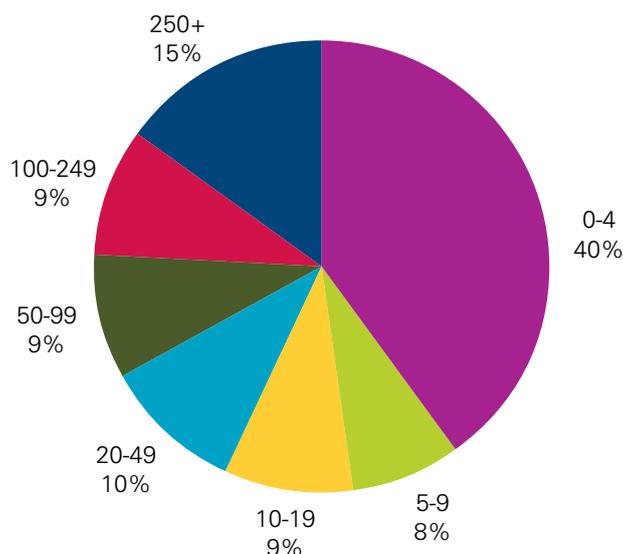


Figure 38. *Distribution of Pharmaceutical companies by employee numbers*



5.4. Trends – Turnover and Employment

The global pharmaceutical industry has undergone significant changes in growth rates over the last 8 years with a marked slowing for prescription drug annual sales growth rates. In 2011-2012 some analysts have indicated that the market for prescription drugs actually shrank by 1.6% while recovering to growth over 2012-2013. Forecasts for future growth indicate that the industry, as a whole, is unlikely to enjoy growth rates of greater than 3-4% per annum going forward. A number of factors will determine an individual company's future growth rate; most important will be the rate of launch of new products, exposure to patent expiry and geographical penetration into high growth markets³⁸.

The trends for pharmaceutical companies reporting sales and employment in the UK is based on data covering 226 companies over 2011-2013, these companies account for 84% and 62% of all 2013 sector turnover and employment respectively. **Figure 39** shows the percentage change in turnover and employment by major segment between 2011 and 2013.

The overall turnover for companies in the pharmaceutical trend group over the period 2011-2013 has decreased 9% primarily as the result of a drop in turnover for the Top 20 global companies. In contrast, the small molecule segment (containing medium to large pharmaceutical companies) posted 4% growth in turnover over the same period. This latter segment includes 33 of the global Top 21-100 companies and in contrast to the Top 20 recorded an increase of 3% in employment compared to a 7.5% drop for the Top 20.

The specialist supplier segment recorded a small increase in turnover between 2012 and 2013 (recovering from a decrease between 2011 and 2012) and the largest increase in employment, both by percentage and absolute numbers. Despite these positive employment trends in the specialist supplier and small molecule segments, the overall trend for the pharmaceutical sector was a 2.7% decrease in employment over 2011 to 2013. The segment containing companies whose main activity is

producing and distributing generic drugs or wholesaling also recorded negative trends in both employment and turnover, although the trend in turnover was impacted by just three company's results (out of a total of 84 records).

Figure 39. Percentage change in turnover and employment between 2011 and 2013 by major segments for the Pharmaceutical sector



The major factors impacting on the pharmaceutical market have led to significant restructuring in companies, particularly the larger research-intensive organisations. Some estimates suggest that over 2000-2010 the global pharmaceutical industry reduced headcount worldwide by nearly 300,000³⁹ and that this re-structuring is likely to continue albeit at a reduced rate. The measured trends in employment in this analysis appear modest against the scale of recent public announcements by the industry, however a number of these announcements were made in 2011 and 2012 and the full impact of the restructuring may not appear in the data used to generate the trends.

5.5. UK Profile

The pharmaceutical industry has sites and activity in all areas of the UK although there are clear areas where employment and sites are concentrated. **Figure 40** shows that the South East, London and East of England contain 60% of the employment and 66% of the sites for the sector, with the North West the fourth largest region in terms of employment.

Figure 41 shows the distribution of pharmaceutical sites across the UK classified as predominantly research, manufacturing or both. In the South East, London and East of England there are almost equal of sites designated as R&D and manufacturing. Most other areas have more sites designated as manufacturing.

Figure 40. Distribution of Employment and sites across the UK for the Pharmaceutical sector

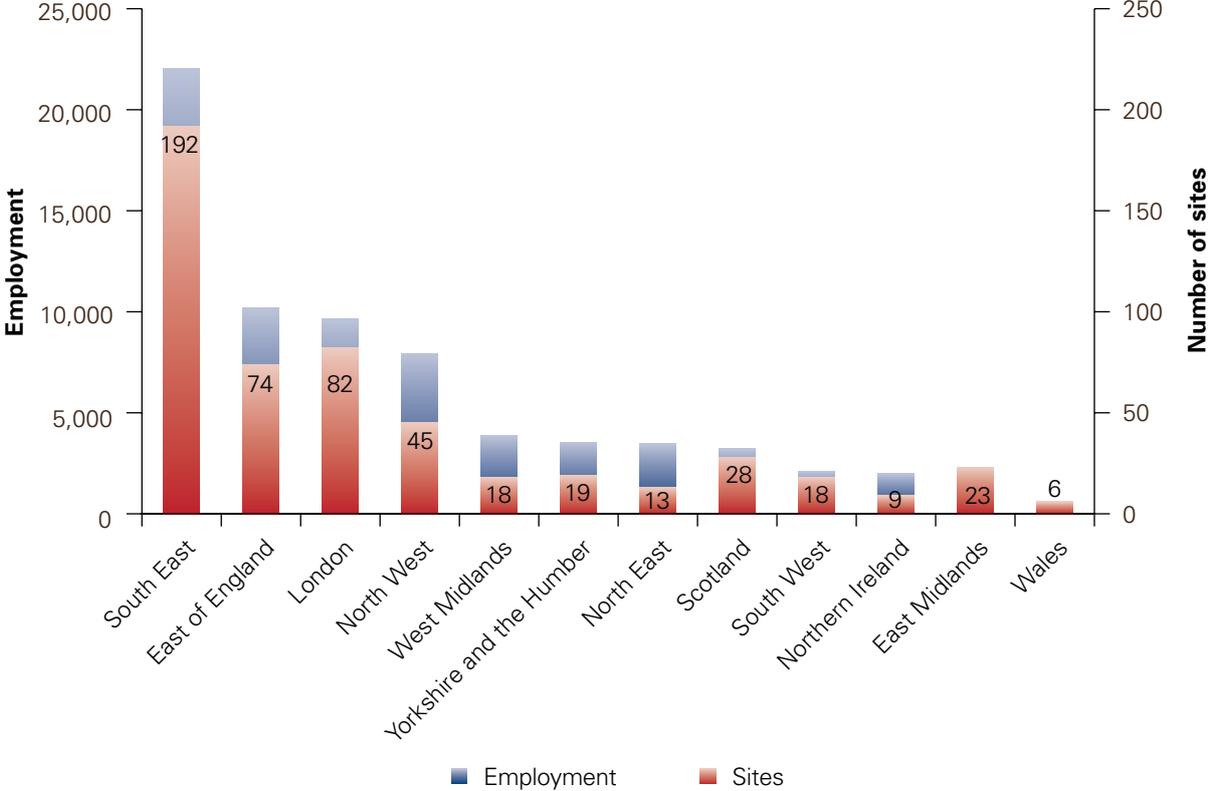
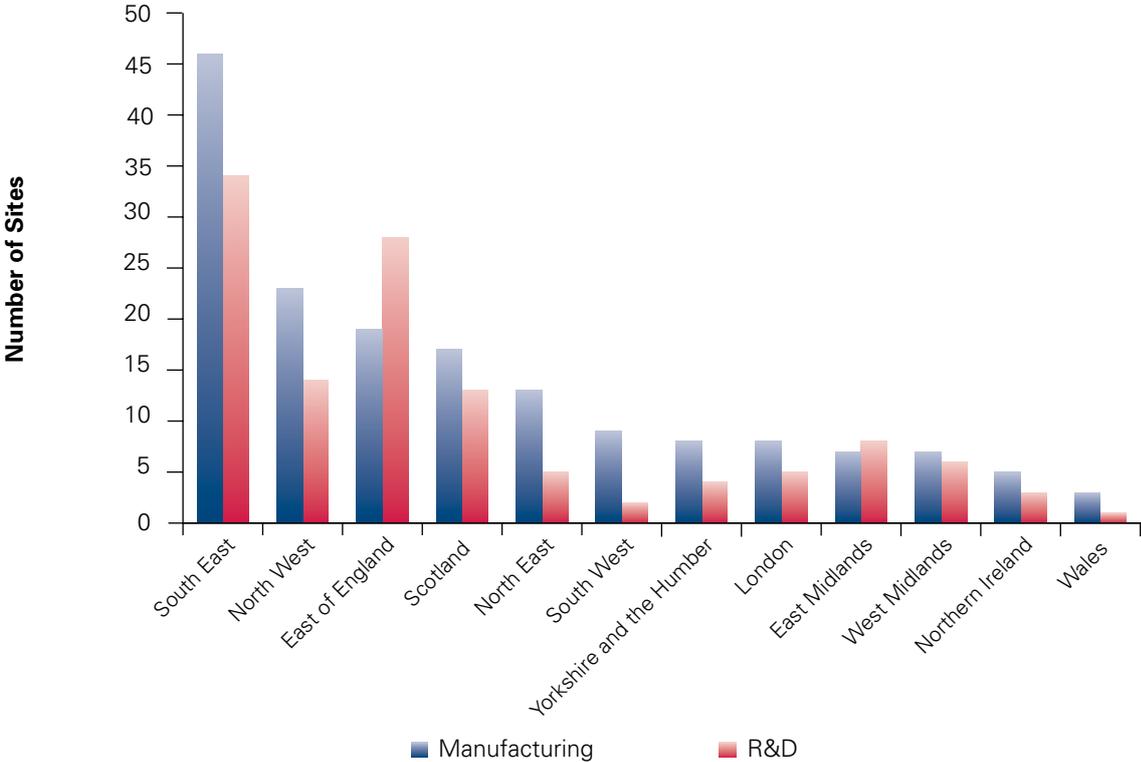
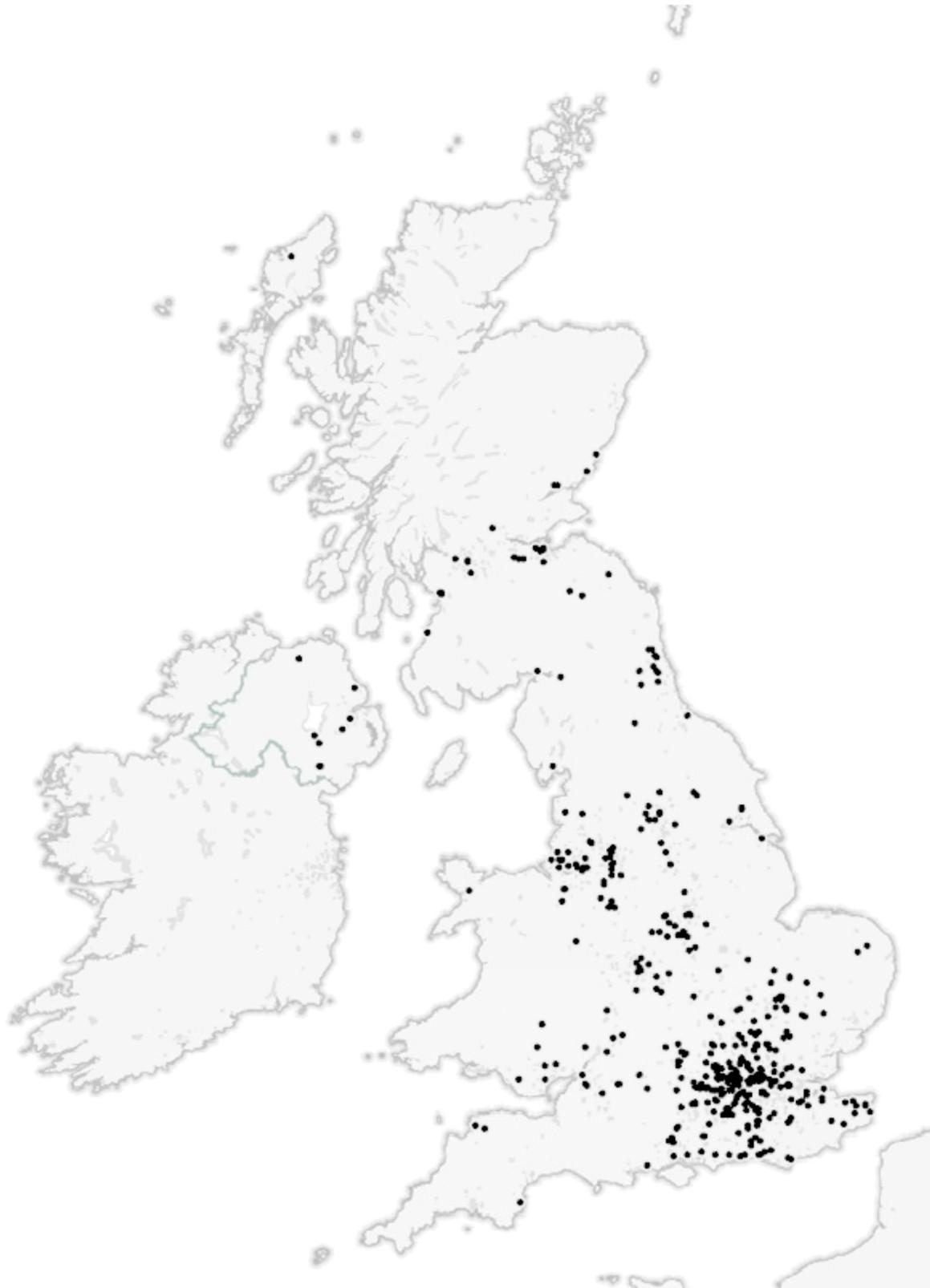


Figure 41. Distribution of manufacturing and R&D sites across the UK for the Pharmaceutical sector



5.6. Geographical Distribution of Pharmaceutical companies



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Data Partner Acknowledgements

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Data Partners
One Nucleus
Medilink East Midlands
Bionow
Invest Northern Ireland
Scottish Enterprise
South East Health Technologies Alliance
MediWales
Welsh Government
Medilink West Midlands
Association of British Healthcare Industries (ABHI)
Association of the British Pharmaceutical Industry (ABPI)
British Healthcare Trade Association (BHTA)
BioIndustry Association (BIA)
Biosciences Knowledge Transfer Network (KTN)
HealthTech and Medicines Knowledge Transfer Network (KTN)
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, Medical Research Council and the Biotechnology and Biological Sciences Research Council and UK Trade and Investment 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 led by Cels Business Services (CBSL) Ltd. The consortium included Click2 (database construction), Kepier Ltd and Lindum Ltd (data integration and analysis).

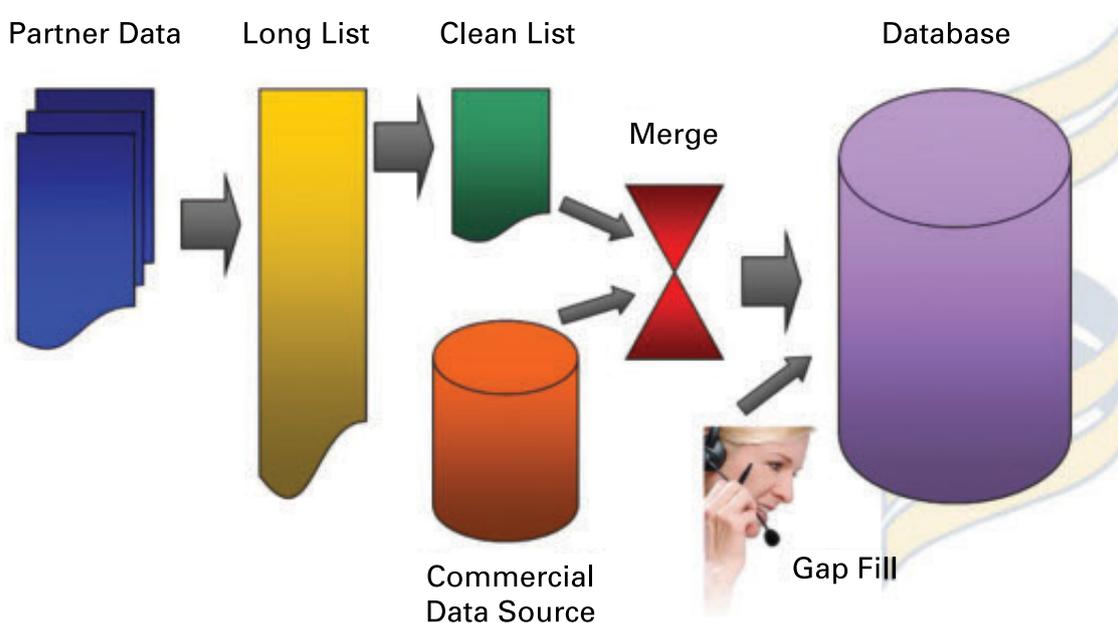
Database Construction – Methodology and Segmentation

Scope

The database covers the geographical area encompassed by 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. Companies that are wholly or partially owned by non-UK entities are included. 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.

Methodology used to construct and update database

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



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 (D&B) and Bureau van Dijke's FAME (FAME) databases. Once matched, information was drawn under license 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.

In the initial construction phase of the database over 7,000 individual records were gathered from the data partners, resulting in over 4,000 unique records for companies that fall within the defined scope for inclusion.

For each annual update, a process is begun in March each year to gather information from the data partners and from online data sources to identify changes to the existing set of company records and new companies that should be included in the database. This long list of annual additions and changes is reviewed by CBSL to create the final list of companies for which data is sourced from D&B and FAME.

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 that fall within the scope of the scheme.

The Segmentation scheme has three distinct elements:

Segmentation of Technology or Service

This is a four 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, industrial biotechnology and Pharmaceutical. Subsequent levels (Levels 1 and 2) provide further analysis for each sector. See the Segmentation Reference Chart that is included in Appendix III.

To date segmentation analysis for each company to Level 1 has been completed, 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 schemes currently adopted by other organisations. This single level scheme was devised to be compatible with the reference schemes.

Most medical biotechnology companies that are engaged in research are categorised to at least one Therapeutic Area.

Segmentation of Business Activity

This classification identifies which elements of Business Activity a company provides and covers: Research and Development (R&D, including Design, Manufacturing, Service and Supply Chain, Sales/Distribution/Service/Repair.

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 and 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

Pharmaceutical	
Code	Description
PHA	Antibodies
PHB	Therapeutic proteins
PHC	Advanced Therapy Medicinal Products (ATMPs)
PHD	Vaccines
PHE	Small molecules
PHF	Blood and tissue products
PHG	Specialist services
PHZ	Unclassified

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

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- 3 World Health Organization – Medical Devices; Managing the Mismatch, 2010
- 4 Presentation from Industrial Biotechnology Leadership forum, Jan 2013
- 5 The use of 50% of the companies in the database is determined by whether the sources for the database contain detailed financial and employment data for the company for all years 2009-2013 or 2011-2013 for the pharmaceutical sector.
- 6 Bioscience and Health Technology Database
- 7 The use of these 1,761 companies is determined by whether the sources for the database contain detailed financial and employment data for the company for all years 2009-2013.
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