HM Government

Strength and Opportunity 2016

The landscape of the medical technology and biopharmaceutical sectors in the UK

Annual Update – 2016

This is the eighth annual report that analyses the information contained in the Health Life Sciences Database, revised in August 2017.

Contents

Ministerial Foreword

We are very pleased to present the eighth annual Strength and Opportunity report on the medical technology and biopharmaceutical sectors. It updates our current state of knowledge about one of the UK's most important industries. Established biopharmaceutical and medical technology sectors, and emerging digital health and genomics, are all seeing fast-paced change in scientific understanding and technological developments. This is driving rapid evolution and development in healthcare and related fields.

The UK retains a prominent 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. In addition to the role played by the sector in the UK economy, its contribution to human health and welfare is fundamentally important.

This report confirms that the UK remains a global hub for life sciences, with the past year sustaining growth in key performance indicators. The database now contains records for 5,142 companies, with a combined turnover of over £63bn and employing 233,000 people.

Since 2011 the UK has secured over £7.5bn of inward investment in the sector, leading to the creation of 18,000 new jobs, and today, the UK has one of the strongest and most productive health and life sciences industries in the world.

This Government remains fully committed to building on the success of the life sciences sector in the UK, as recognised in the Industrial Strategy Green Paper. We are looking forward to the publication of Professor Sir John Bell's work on the Life Sciences Industrial Strategy which will set out a vision to make the UK a test bed for clinical research and medical innovation, as well as a highly competitive location for manufacturing. We are already taking action to ensure the UK's competitiveness, both through the Industrial Strategy and the Accelerated Access Review, to which we will be responding in the coming months.

This report makes a vital contribution to our understanding of the number, type and geographical distribution of life science companies in the UK. We hope that this continues to be a helpful resource for people looking at the shape of the sector and trends over time. We would like to thank everybody who has contributed, in particular the Trade Associations, Medilinks and life sciences networks.

Lord Prior of Brampton
Parliamentary Under Secretary of State of the Department for Business, Energy and Industrial Strategy

Lord O'Shaughnessy of Maidenhead
Parliamentary Under Secretary of State of the Department of Health

Introduction

0.1 This report identifies the strengths in the UK health life sciences industry and the opportunities for future growth. The content of the report provides a 2016 snapshot of the UK life science industry covering the Biopharma and Med Tech sectors[1]. The three main measures of economic contribution and industry structure are:

- employment – the number of people employed by life science companies;
- turnover – the amount of money taken by businesses within scope of life science sector activities; and
- number of companies – the number of life science companies registered in the UK.

This report demonstrates the significant economic contribution of the life science sector in terms of company turnover and employment, distributed across the UK.

0.2 This version of the report was revised in July 2017 to:

- amend an error in one medical technology service & supply company that had been incorrectly matched to an employment and turnover record;
- improve the language used when reporting employment and turnover proportions to make clearer whether the proportion is of the industry, sector or segment;
- amend an error in UK-owned Biopharma Core employment; and
- amend the segmentation code list (Annex 4) to reflect the full range of codes used for each segment in the analysis (documentation update only, no changes to analysis).

0.3 It contains analyses of the industry looking at the economic activity of companies that market therapeutic products and medical devices as well as the specialist service & supply chains that are key parts of the ecosystem. A segmentation approach is applied that enables a detailed analysis of the product and service categories that make up the industry[2].

0.4 The analysis is based on the 2016 database of sites and companies updated between October and December 2016 using the methodology summarised in Annex 3. The number of records in the 2016 database is 6,042, which corresponds to 5,142 companies. The difference between the numbers of records is due to companies with multiple sites or legal entities. These sites

1 The data does not include industrial biotechnology, animal health or not-for-profit organisations
2 See Annex 4 for a description of the segmentation categories

and entities may operate in multiple sectors, segments and regions, meaning analyses of companies at these levels refer to sites and entities as companies."

0.5 There are an additional net 416[3] records in the 2016 database compared to 2015. The change in the number of records is due to the following additions and removals:

- Added 618 records of companies that were formed more than 12 months before the update but not identified in previous annual updates;
- Added 57 records for companies that were formed in the 12 months since the last annual update;
- Added 13 records that are new sites for companies in the 2015 database;
- Added 3 companies previously reported as ceased trading now trading;
- Removed 199 companies that have ceased trading;
- Removed 67 companies that are either reviewed as now not-in-scope, ceased trading more than 12 months ago or duplicates; and
- Removed 9 records of sites that have closed.

The Life Science industry – Key messages

0.6 The life science sector employs 233,400 people or approximately 0.89% of all private sector employment[4]. There are 5,142 companies generating approximately £63.5bn in annual turnover.

0.7 The industry is composed of two sectors:

- Biopharma sector – comprises 543[5] companies developing and marketing human therapeutics employing an estimated 62,600 people and generating £29.1bn in annual turnover. The Biopharma Service & Supply sector contains 1,314 companies employing an estimated 50,800 people and generating £12.8bn in turnover; and
- Med Tech – comprises 2,477 medical device companies employing an estimated 93,600 people and generating £17.1bn in annual turnover, of which £1bn is from digital health companies. The medical device companies are supported by a service & supply sector of 986 companies employing an estimated 26,400 people generating £4.5bn in annual turnovers.

3 In the 2016 annual update process 3,894 records were received for review from the data partners and other sources, of this 1,054 were already in the database, the remaining 2,480 records were reviewed from which 691 records were added to the database the remainder were assessed as out-of-scope.
4 Based on ONS Employment by Industry release 15th Feb 2017
5 The sum of the number of companies in the sector data is greater than the industry total because some companies are active across more than one sector – for example large medical device companies that also produce biopharmaceuticals

0.8 The Top 5 segments in the industry based on people employed are: Biopharma companies primarily involved in therapeutics based on small molecules; biopharmaceutical contract manufacturers and research companies; suppliers of Biopharma consumables and equipment; Med Tech companies producing single use devices; and digital health companies.

0.9 Companies with less than 250 employees make up 96.5% of the total and there are 14 companies that employ more than 1,000 people. Where ownership data is available[6], this shows that 57% of companies are UK owned and these companies employ 47% of the UK life science workforce.

0.10 Over the period 2011 to 2016, the industry has shown a positive growth trend in employment of 2.8% CAGR[7] while the turnover trend was essentially flat at 0.1% growth[8]. The slow growth in turnover is primarily due to decreases seen over 2011–2013 in the Core Biopharma sector. Since that period the Biopharma sector has shown a return to annual growth in turnovers from 2013 to 2016.

0.11 By analysing the change in all company data between 2015 and 2016 associated with trading, company creation and cessation we estimate that like-for-like growth over this period was 3.5% for employment and 6.2% for turnover[9] (this compares to 2.4% and 14.8% in the trend data set).

0.12 The Med Tech sector showed strong employment growth estimated at 9.5% over 2011-2016. The majority of this growth was in core medical device companies that grew an estimated 10.6% CAGR with mobility access (e.g. stair lifts) and digital health segments performing strongly.

0.13 Over the same period we recorded the formation of 908 new companies across the life science industry. As of 2016, these companies employ an estimated 4,800 people, and 70% of these new companies and associated employment are in the Med Tech and Biopharma service & supply sectors.

0.14 In the Biopharma sector the emerging technology area of Advanced Therapy Medicinal Products or ATMPs was the only segment to show positive employment growth over 2011–2016. While in the Med Tech, the emerging sector of Digital Health showed a positive double digital growth in employment.

6 Ownership data was available for 2,915 of the legal entities in the source database or 48%
7 CAGR stands for Compound Annual Growth Rate
8 Estimates of growth rates in the industry are based on a subset of companies in the database where we have continuous data covering the years 2011 to 2016 this weights the data towards the larger companies rather than SMEs. The companies in the trend dataset make up 55.8% and 52.1% of the industry's total 2016 employment and turnover respectively
9 Information on the methodology for these estimates is presented in Annex 1

0.15 The Digital Health segment contains 427 companies, the largest number of all Med Tech segments and employs an estimated 9,600 people, the second largest segment by employment after Single-Use Technology. The Digital Health segment generated turnover of just over £1bn. The largest sub-segment contains companies involved in hospital information systems such as electronic medical records.

0.16 Two thirds of industry employment is outside of London and the South East with significant concentrations in the East (an estimated 38,000 people) and North West of England (an estimated 26,000 people). Compared to the Biopharma sector where 37% of sector employment is focused in the South East of England including London, the Med Tech sector is less focused with this area representing 27% of employment.

Terminology

"**Core Biopharma**" includes all companies whose business involves developing and/or producing their own pharmaceutical products – from small, R&D-focused biotechs to multinational Big Pharma.

Biopharma Service & Supply comprises companies that offer goods and services to Core Biopharma companies. These include contract research and manufacturing organisations, suppliers of consumables and reagents for R&D facilities, providers of specialist analytical, IT, recruitment and logistics services as well as legal and regulatory expertise and finance companies specialising in biopharma investments.

"**Core Med Tech**" includes all companies whose primary business involves developing and producing Med Tech products (ranging from single-use consumables to complex hospital equipment, including digital health products).

Med Tech Service & Supply sector comprises companies that offer services to Core Med Tech companies. This includes contract research and manufacturing organisations, suppliers of consumables and reagents for R&D facilities, providers of specialist analytical, IT, recruitment and logistics services as well as legal and regulatory expertise and finance companies specialising in med tech investments.

Digital health includes companies involved in making products for both hospitals and consumers including products such as hospital information systems, GP information systems, and E-health – data analytics. Digital health also includes companies producing mobile medical devices that have significant a digital component essential for their functionality.

Industry is the term used to collectively describe all Sectors covered in the analysis

Sector is the term used to describe Core Biopharma, Core Med Tech, Biopharma Service & Supply or Med Tech Service & Supply

Segment is the term used to describe the individual product or service groups within a Sector (see Annex 4 for the detail description of segments)

Trend data set refers to the subset of companies within a segment that is used to calculate the compound annual growth rates for employment and turnover. The sets only include those companies in the database for which there exists continuous data covering the years 2011 to 2016; this weights the data towards the larger companies rather than SMEs.

Real Growth (or like-for-like) refers to analysis of the change in employment and turnover between 2015 and 2016 based on 89% of all records in the database (the majority of those excluded are companies that were added to the database in 2016 that are older than 12 months). This analysis includes large companies and the majority of small to medium size enterprises.

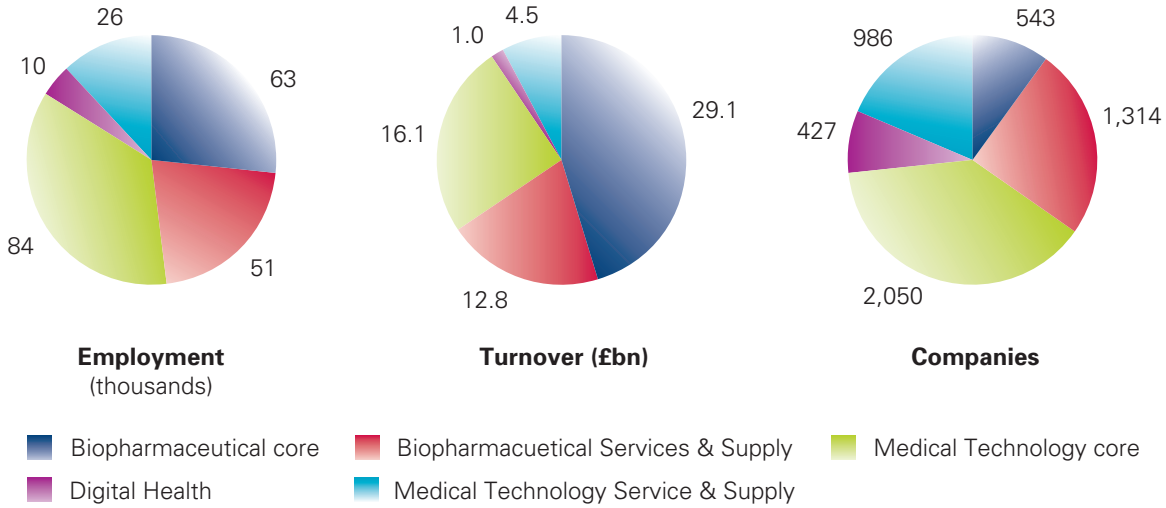
List of Figures

The data, charts and figures included in this document is published at https://www.gov.uk/government/publications/life-science-sector-data-2016

Chapter 1

Industry Overview

Figure 1. *Comparison of employment, turnover and number of companies for the four life science industry sectors and the digital health segment*



1.1 **Figure 1** shows the landscape of the industry and the economic measures of activity summarised by employment, turnover and number of companies in each sector and for the digital health segment.

1.2 The industry employs 233,400 people and 120,000 (52%) are employed in the Med Tech sector. Core Med Tech employs 94,000 which is 40% of the industry. Within the Med Tech sector 10,000 are employed in digital health, and a further 26,000 (11% of the industry) in service & supply companies that support the sector. The Core Biopharma sector employs 63,000 (27% of the industry) in 543 companies supported by a service & supply sector that employs a further 51,000 people (21% of the industry).

1.3 The Med Tech sector has the largest number of companies in the industry, with 65% of all companies. Within this sector the digital health segment contains the largest number of companies and is the 3rd largest segment by employment.

1.4 In terms of turnover from UK based activity, the Biopharma sector has the largest proportion of the industry's £64bn annual turnover. The sector had turnover of £41.8bn of which £29.1bn is from the 543 companies that develop and market therapeutic products.

1.5 The segment of Biopharma companies whose main activity is classified as Small Molecule[10] therapeutics is the largest in terms of employment and turnover representing 50,554 (21.7% of the industry) and £23.6bn (37% of the industry) respectively of the UK totals. The 459 companies in this segment include all of the global Top 20 pharmaceutical companies (based on turnover)[11] who have activity in the UK.

1.6 The contribution of global Top 30 Med Tech companies[12] to Core Med Tech sector is 22,800 (24%) of the total employment and £6.5bn (38%) of the turnover. Med Tech companies with more than 250 employees represent 35,340 (29%) of the all Med Tech employment compared to 46,485 (64%) for Biopharma.

1.7 **Figure 2** shows the Top 5 segments (excluding the service & supply companies) in the life science industry in terms of employment, turnover and number of companies, highlighting the importance of segments from the Med Tech sector alongside small molecule therapeutics in terms total UK activity.

- The five segments of small molecules, single use technology, digital health, orthopaedic devices and in-vitro diagnostics contain 86,810 (56%) of the employment for Core Biopharma and Med Tech companies.
- The five segments of small molecules, single use technology, therapeutic proteins, vaccines and orthopaedic devices contribute £30.9bn (67%) of the total turnover for Core Biopharma and Med Tech companies.

10 Companies that are classified in the small molecules segments may develop and market other classes of therapeutic products such as antibodies. Where the proportion of activity associated with other therapeutics for an individual company is available this will distributed into the appropriate segment. If the data is not available all activity is classified in the segment where most UK economic activity of a company is estimated to be derived

11 The Top 20 ranking as based on http://www.pharmexec.com/2016-pharm-exec-50

12 The Top 30 ranking as based on http://www.mpo-mag.com/issues/2016-07-01/view_features/top30-medicaldevice-manufacturers/

Figure 2. *Top 5 segments (excluding the service & supply companies) in the life science industry in terms of employment, turnover and number of companies*

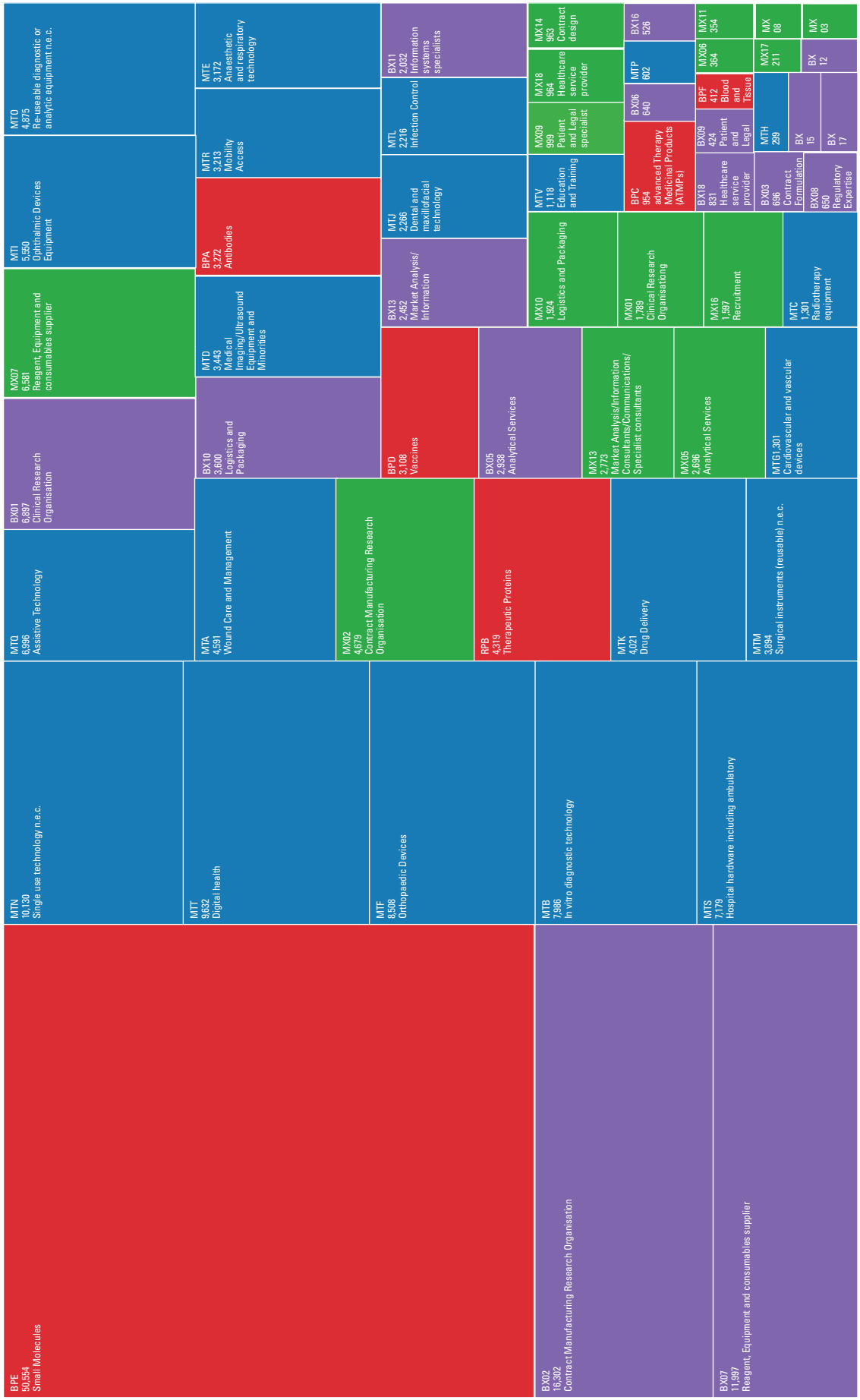
	Employment	Turnover	Number of Companies
1st	Small Molecules	Small Molecules	Small Molecules
2nd	Single Use Technology	Single Use Technology	Digital Health
3rd	Digital Health	Therapeutic Proteins	Assistive Technology
4th	Orthopaedic Devices	Vaccines	In vitro diagnostic technology
5th	In vitro diagnostic technology	Orthopaedic Devices	Single Use Technology

1.8 An alternative view of the distribution of employment in the life science industry is shown in the tree diagram format in **Figure 3**. This confirms the importance of small molecule therapy companies in terms of employment and of the two largest segments in the Biopharma service & supply sector: Contract Research and Manufacturing companies, and suppliers of Reagents and Equipment[13].

1.9 Emerging and growing product segments are key contributors to employment and turnover of the industry. In Biopharma, new therapies based on large molecule technologies such as those used to produce therapeutic proteins and antibodies now account for 47% of sales of the Top 100 biopharmaceutical products, up from 30% in 2008[14]. In UK the therapeutic proteins segment is the third largest overall in terms of turnover in Core Biopharma and Med Tech at an estimated £2bn annual turnover and along with antibodies had positive turnover growth trends over 2011-2016.

13 Suppliers of equipment and reagents are not exclusive suppliers to Core Biopharma and also supply the academic sector
14 EvaluatePharma® World Preview 2016, Outlook to 2022, Sept 2016

Figure 3. *Tree Diagram representation of the employment per segment for the life science industry (Key: Red = Core Biopharma, Blue = Core Med Tech, Purple = Biopharm service & supply, Green = Med Tech service & supply). Data included includes segment code (BPE etc.) and number of employees*



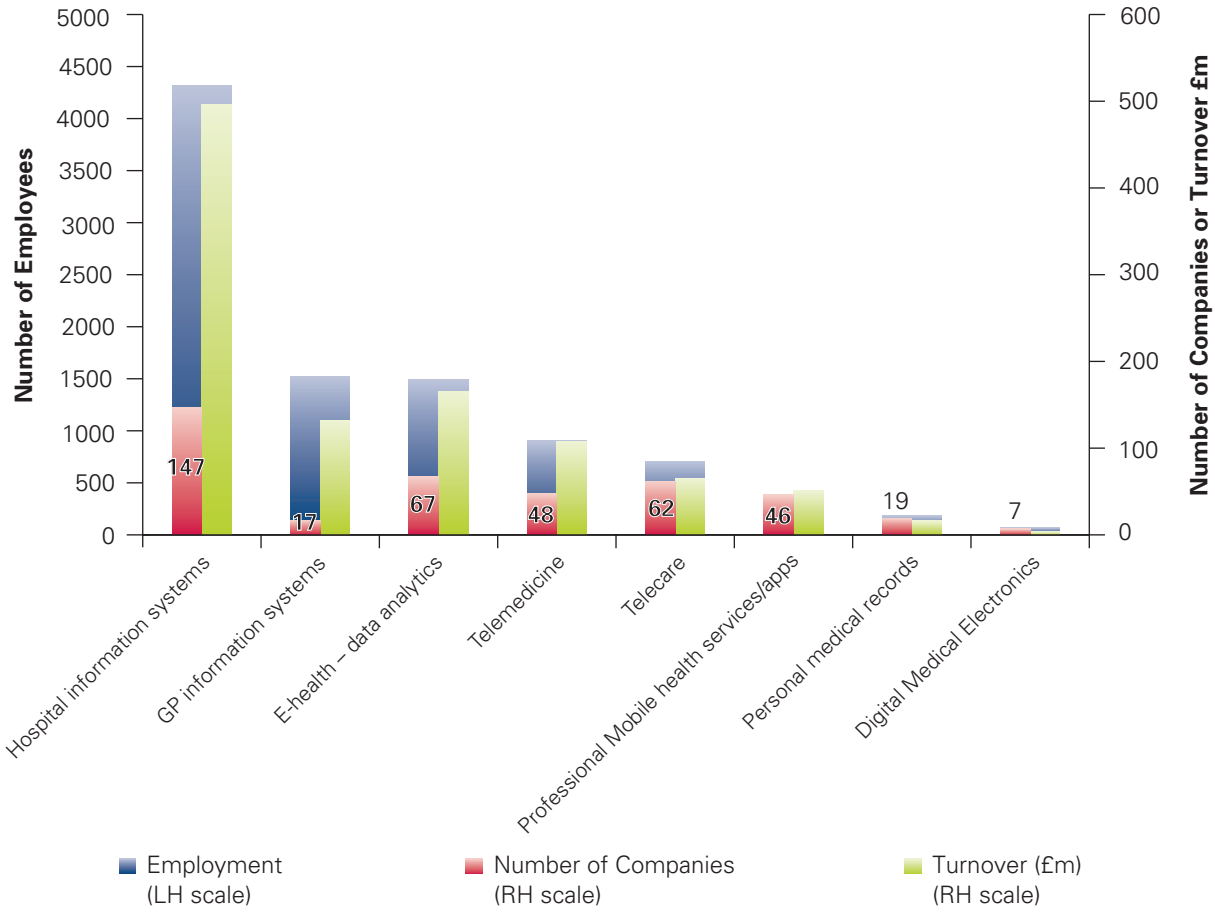
1.10 In the Med Tech sector the emerging sector of digital health is a significant contributor to employment with an estimated 9,600 people employed in 427 companies[15]. The segment has the 5th largest turnover at just over £1bn of the Core Med Tech segment and has shown strong growth in employment of 20% CAGR over 2011 to 2016 and a decline of 3.5% in turnover.

1.11 The digital health segment includes companies producing software to support the management of primary and secondary healthcare systems including electronic patient records, health analytics software companies that assist healthcare professionals in clinical care and mobile medical device companies that rely on software for key elements of their functionality.

1.12 **Figure 4** shows the employment, turnover and number of companies for the digital health sub segments that employ more than an estimated 50 people. The three largest segments in terms of both employment and turnovers are hospital information systems, GP or primary care information systems and E-health or data analytics. Together these three sub-segments account for 7,330 (76%) of employment and £0.8bn (76%) of turnover for the digital health sector.

15 Employment and turnover in the digital health segment is based on data for companies that have the majority of the economic activity in the segment. This analysis does not include the activity in large multi-market companies that may have a significant level of activity that is a low percentage of their overall activity. Therefore the overall economic activity in the segment is estimated to be larger than quoted.

Figure 4. *Employment, number of companies and turnover for the Digital Health sub-segments (only segments that employ >50 people are shown)*



1.13 The digital health segment is a relatively young industry with 109 (26%) of the companies incorporated in the last 5 years and 200 (47%) in the last 10 years, this compares with 700 (14%) and 1,804 (35%) respectively for all life science companies[16].

1.14 Both the Core Biopharma and Med Tech companies are supported by large specialist UK based service & supply sectors. The Biopharma service & supply sector employs 50,800 people in 1,314 companies with turnover of £12.8bn. The largest segments in the sector are Contract Manufacturing and Research, Reagent & Equipment suppliers and Clinical Research Organisation that together employ 28,300 people and account for £10.4bn (72%) of the turnover.

1.15 The Med Tech service & supply chain sector employs 26,400 people in 986 companies with a turnover of £4.5bn. The largest segments in the sector are Reagent & Equipment Suppliers, Contract Manufacturing and Research and Specialist Consultants (excluding regulatory) that together employ 14,000 people and account for £2.4bn (54%) of the turnover.

16 Data based on the 97% of life science companies and 94% of digital health companies for which the date of formation is known

Chapter 2

Sector Overviews – Key Facts and Trends

2.1 Biopharma sector

- The Biopharma sector contains 1,857 identified companies that generate a turnover of £42bn and employ 113,400 people across the UK.
- The sector comprises companies developing, manufacturing and selling therapeutic products supported by an extensive network of service & supply companies. There are 543 companies selling therapeutic products with turnover of £29.1bn and employing 62,600 people. The 1,314 service & supply companies employ 50,800 people or 45% of the sector and generate £12.8bn in turnovers from UK activity.
- Companies developing and producing therapeutic products using small molecule technology comprise the largest segment employing 50,554 (81%) of Core Biopharma employees and generating £23.6n (81%) of the turnover. The therapeutic proteins and antibodies are the next largest segments.
- Within the service & supply network the 295 companies that supply contract manufacturing or research services make-up the largest by employment with 16,300 people while reagent and equipment suppliers generate the largest revenue at £6.7bn. The third largest segment by employment includes clinical research organisations and together the top 3 segments account for 69% of Biopharma service & supply employment.
- Over the period 2011 to 2016, the sector overall had a decreasing employment trend estimated at 1.1% CAGR due to a decrease of 2.2% in the Core Biopharma sector while the service & supply chain grew by 1.2%. Turnover for the whole sector decreased at 0.5% CAGR with growth in the last 3 years partially reversing drops in the previous years.
- A decrease in employment in the small molecule and vaccines segments was partially reversed by large increases in the contract manufacturing and research, reagent and equipment and analytical services segments.

- Over the last 10 years, 247 Core Biopharma companies have been formed and now employ an estimated 2,300 people.
- The majority of the sector companies are SMEs with 90% of Core Biopharma and 96% of service & supply companies employing less than 250 people.
- There are 213 identified UK-owned Core Biopharma companies that employ 33,289 (29%) of the sector total and have £13.6bn (32%) of the turnover. In the service & supply sector the 343 identified UK-owned companies employ 16,439 (14%) of the total.
- There is economic activity in the Biopharma sector across the UK with a concentration in the South East, East and North West of England and London. These four areas account for 78,689 (69%) of the employment in the sector and this proportion rises to 80% for the Core Biopharma sector.

2.2 Biopharma – Core companies

2.2.1 "Core" Biopharma includes all companies whose business falls under developing and/or producing their own pharmaceutical products – from small, R&D-focused biotechs to multinational Big Pharma.

2.2.2 Overall the Core Biopharma sector contains 543 companies employing 62,600 people and with a turnover of £29.1bn in 2016.

2.2.3 The sector breakdown shows that companies whose main economic activity involves small molecule therapeutics form the largest segment, accounting for 459 (65%) of companies, 50,554 (81%) of employees and £23.6n (81%) of turnover. This segment contains some of largest companies in the industry; of the 76 life science companies that employee more than 500 people, 24 are in the Small Molecule segment. Therapeutic Proteins, Antibodies and Vaccines are the next largest segments, together making up 10,697 (17%) employees and £4.9bn (17%) of turnover.

2.2.4 Geographical analysis of employment shows Core Biopharma companies in all areas of the UK with the greatest concentration in the South East, East of England, and in London which together account for 41,924 (67%) of Core Biopharma employment.

2.2.5 Analysing the size of the companies shows a significant proportion of larger companies with 68 (10%) employing more than 250 people and 214 (30%) with a turnover greater than £5m, which is 19% of all life science companies with this level of turnover.

2.2.6 Analysis of growth based on the trend data set shows that both employment and turnover have declined at 2-4% over the period 2011-2016 with declines occurring in the first three years of this period with growth returning over 2014-2016. The fastest growing sub-segment is Advanced Therapy

Medicinal Products (e.g. cell-based therapies) which is the only sub-segment that has positive trends of in both employment (1.5%) and turnover growth (35%). Therapeutic Proteins and Antibodies sub-segments also showed turnover growth. We have estimated like-for-like growth between 2015 and 2016 for all Core Biopharma companies[17] and we estimate the sector has increased employment by 1,030 and turnover by £2bn.

2.3 Biopharma – Service and supply chain

2.3.1 The Biopharma Service & Supply sector comprises companies which offer goods and services to Core Biopharma companies. This includes contract research and manufacturing organisations, suppliers of consumables and reagents for R&D facilities, providers of specialist analytical, IT, recruitment and logistics services as well as legal and regulatory expertise and also finance companies specialising in biopharma investments (but not counting their portfolio assets).

2.3.2 Overall the Biopharma service & supply chain consists of 1,314 companies, 50,800 employees and generates a turnover of £12.8bn. The sector represents 45% of the total employment in the Biopharma sector and 31% of the turnover.

2.3.3 The sector breakdown shows the largest employing segments are Contract Manufacturing and Research Organisations that together consist of 295 companies employing 16,300 people. The largest segment in terms of turnover is Reagent & Equipment suppliers that together represent £6.7bn (52%) of the total. Clinical research organisations completes the Top 3 Biopharma service & supply segments; in total the Top 3 account for 35,196 (69%) of the employment.

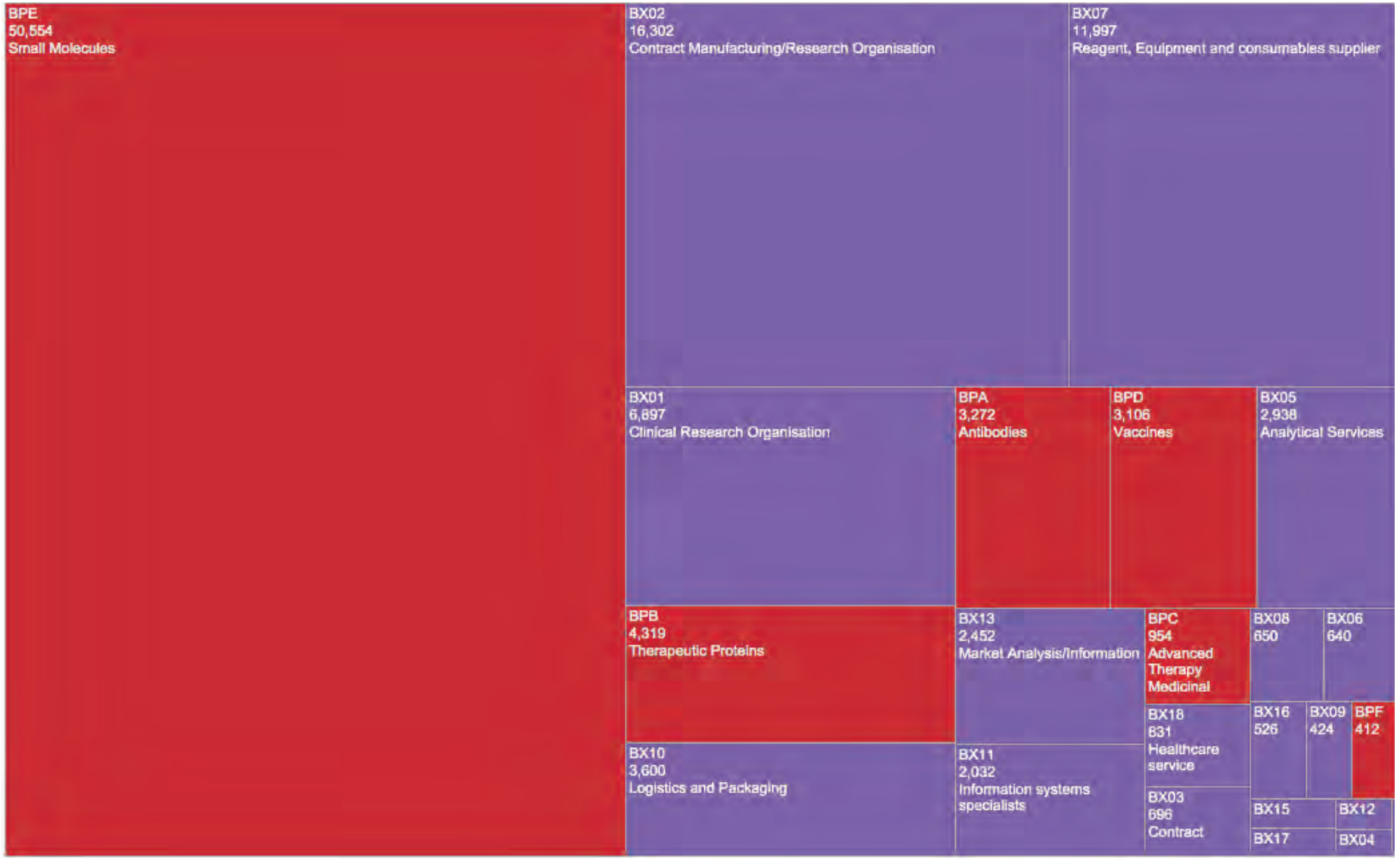
2.3.4 Geographical analysis of employment shows the South East and East of England have the most service & supply companies and employees, followed by Scotland, the North West and the Midlands.

2.3.5 Analysing the size of the companies shows that the service & supply sector has a greater proportion of micro companies (less than 5 employees) than the Core Biopharma sector (55% v 43%) and a smaller percentage of companies with more than 250 employees (4% v 10%). There are 15 biopharma service & supply companies that employ 500 or more people.

2.3.6 Analysis of growth based on the trend data set shows that both employment and turnover have both increased over the period 2011-2016 by 1.2% and 4.7% respectively, led by growth in the Contract Manufacturing and Research Organisations and Specialist Consultants. Analysis of the like-for-like growth between 2015 and 2016 estimates that the biopharma service & supply sector grew employment by 3,700 and turnover by £1.3bn. The Contract Manufacturing and Research Organisations and specialist consultants, as seen in the trend data set analysis led growth in employment.

17 Using a method to estimate "real growth" in data – see Annex 1

Figure 5. *Tree Diagram representation of the employment per segment for the Biopharma sector (Key: Red = Core Biopharma, Purple = Biopharma service & supply). Data included includes segment code (BPE etc.) and number of employees*



2.4 Med Tech Sector

- The Med Tech sector contains 3,463 identified companies that generate a turnover of £21.6bn and employ 120,000 people across the UK
- The sector comprises companies developing, manufacturing and selling medical devices supported by an extensive network of service & supply companies. There are 2,477 companies selling medical devices with turnover of £17.1bn and employing 93,600 people. The 986 service & supply companies employ 26,400 people, or 22% of the sector, and generate £4.5bn in turnovers from UK activity.
- Companies producing single-use technology devices such as syringes, catheters and dialysis kits comprise the largest segment employing 10,130 (10.8%) of medical device employees and generating £2.1bn (12.4%)of the turnover.
- The Top 5 medical device segments for employment are: single use technology, digital health, orthopaedic devices, in-vitro diagnostics, and hospital hardware and together these segments employ 43,435 (36%) of the sector total. The Digital Health segment contains the largest number of companies and sites followed by Assistive Technology (wheel chairs and other non-digital devices) and In-vitro Diagnostics.
- Within the service & supply network, the 289 companies that supply consumables and equipment make-up the largest segment employing 6,581 and generating £1.5bn (33%) of the turnover. Companies involved in contract research or manufacturing and specialist consulting (non-regulatory) make up the next largest segments by employment.
- Over the period 2011 to 2016, the sector showed positive trends in both employment and turnover growth with CAGR's of 9.5% and 1.8% respectively. Medical device companies grew employment every year with an overall employment CAGR% trend of 10.6% with every segment showing growth. The service & supply companies recorded employment growth of 5.4% while turnover grew 10.9%.
- The top 3 fastest growing core Med Tech segments for employment were Drug Delivery including infusion systems, Mobility Access including stair lifts and Digital Health.
- Over the last 5 and 10 years, the largest number of companies were formed in the In Vitro Diagnostics' and Digital Health segments.

- The majority of the sector (Core and sevice & supply) companies are SMEs with 98% employing less than 250 staff and 82% with turnover less than £5m. There are an estimated 688 companies with a turnover >£5m per annum and an estimated 81 with turnover >£50m.
- There are 812 identified UK-owned Core Med Tech companies that employ 37,910 (32%) of sector total and have £6bn (28%) of the turnover. In the service & supply sector the 301 identified UK-owned companies employ 11,230 (9%) of the total.
- The Southeast of England is the location for 647 (19%) of sector companies and 23,649 (19.7%) of sector employment. Significant concentrations of economic activity are based in the East of England, across the Midlands, the Northwest of England, Yorkshire and the Humber.

2.5 Med Tech – Core companies

2.5.1 "Core" Med Tech includes all companies whose primary business falls under developing and producing their own Med Tech products (ranging from single-use consumables to complex hospital equipment and including digital health products).

2.5.2 Overall the Core Med Tech sector has 2,477 companies employing 93,600 people with a turnover of £17.1bn.

2.5.3 The sector break down shows the largest segment by turnover is Single Use Technology (i.e. disposables) followed by Orthopaedics, In Vitro Diagnostics, Wound Care and Digital Health. These top five segments account for £7.4bn (43%) of the Core Med Tech turnover. Single Use Technology is also the largest segment by employment followed by Digital Health, Orthopaedics, In Vitro Diagnostics and Hospital Hardware. These top five account for 43,435 (46%) of sector employment.

2.5.4 Geographical analysis of employment shows there are companies spread across the UK with a concentration in the South East England and the Midlands representing 21,024 (22%) and 17,758 (19%) respectively of the total Core Med Tech employment followed by Yorkshire and the Humber at 11,717 (12.5%).

2.5.5 Analysis of the size of companies shows that of the 2,477 companies and sites, 1,206 or 49% have less than 5 employees with the largest proportion in Digital Health (21% of the total or 255), followed by Assistive Technology. A similar pattern is seen with turnover with Digital Health having the highest number of companies with a turnover of less than £50,000 (129). The segment with the largest number of companies with turnover over £5m is Single-use Technology (68) followed by In- vitro Diagnostics (49). For the whole sector there are 25 companies that employ more than 500 people.

2.5.6 Analysis of growth based on the trend data shows Core Med Tech companies turnover growth of 0.3% CAGR over 2011- 2016 with employment growth of 11%. All segments show a positive employment growth trend over this period with the top 3 fastest growing segments achieving >20% CAGR (digital health, mobility access and drug delivery). Analysis of like-for-like growth over 2015 to 2016 estimates that the Core Med Tech employment grew by 1800 while turnover was essentially flat. Growth in employment was led by the digital health segment.

2.6 Med Tech – service and supply chain

2.6.1 The Med Tech Service & Supply sector comprises companies which offer services to Core Med Tech companies. This includes contract research and manufacturing organisations, suppliers of consumables and reagents for R&D facilities, providers of specialist analytical, IT, recruitment and logistics services as well as legal and regulatory expertise and finance companies specialising in med tech investments (but not counting their portfolio assets).

2.6.2 Overall the Med Tech Service & Supply sector has 986 companies, 26,400 employees and a turnover of £4.5bn.

2.6.3 The sector break down shows the largest segment of the sector is Reagent, Equipment and Consumables suppliers which contains the highest number of companies (289) and employs 25% of the sector's total (6,581) and 33% of its turnover (£1.5bn). The next largest segments by employment are Contract Manufacturing and Research companies followed by Specialist Consultants.

2.6.4 Geographical analysis shows, in contrast to Core Med Tech, that top 3 areas are the North West, East of England and the East Midlands. These three areas account for 13,037 (49%) of the employment and £2.1bn (46%) of the turnover for Med Tech Service and Supply.

2.6.5 Analysis of the size of companies shows that just over half (54% or 533) of all companies in the sector are micro companies with less than 5 employees. The specialist consultant segment has the largest number of micro companies (60% or 202 of the companies in the segment employ less than 5 people). There are 18 companies in the sector that employ 250 or more employees and 5 that employ more than 500.

2.6.6 Analysis of growth of the trend set of Med Tech service & supply companies shows turnover growth of 11% CAGR over 2011- 2016 while employment grew by 5.4%. Employment has shown a positive trend since 2014 recovering decreases seen in previous years. The largest two segments, contract manufacturing and research, and reagents and equipment suppliers recorded growth trends in employment of 3.6% and 1.1% respectively. Analysis of real or like-for-like growth estimates that Med Tech service & supply sector grew employment by 1,200 or 5% from 2015 while turnover grew 9.5% (£0.4bn).

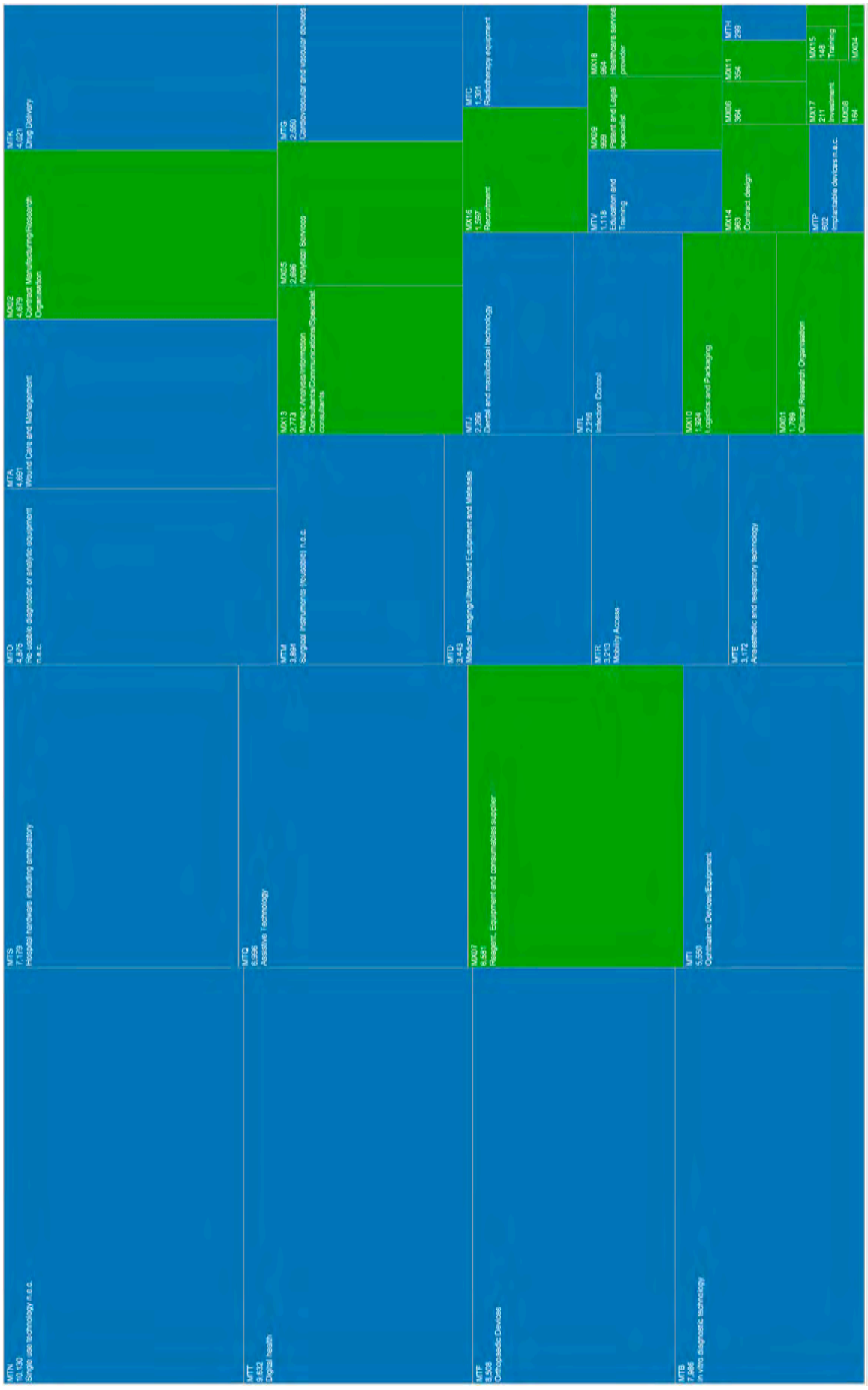


Figure 6. *Tree Diagram representation of the employment per segment for the Med Tech sector (Key: Blue = Core Med Tech, Green = Med Tech service & supply). Data included includes segment code (MTN etc.) and number of employees*

Chapter 3

Sector Growth Trends

3.0.1 The analysis of sector growth trends looks at two measures; a set of companies (the "trend set") for which data is available from consistent sources over the period of analysis 2011-2016; and a calculation of the "real growth" in employment and turnover between 2015 and 2016 data sets.

3.0.2 The trend data sets are based on financial accounts from companies that have submitted these to Companies House rather than data produced by third parties using algorithms that estimate measures such as employment or turnover. For this reason, the data set is weighted towards larger companies that have to file full accounts, for example 41% of the records in the employment trend set contain more than 20 employees, compared to 27% for all companies in the database. In total the trend data sets for life sciences account for 56% of the total employment and 52% of total turnover for the life science industry covered in the analysis.

3.0.3 The real growth or like-for-like calculations looks at the differences in the databases for 2015 versus 2016 and removes changes not attributable to trading effects, company formation or cessation, and restructuring (changes in account sources due to change in legal structure)[18]. The real growth is based on data from 5421 records or 89% of the database.

3.1 Sector growth – trend set of companies

3.1.1 Based on the trend set of companies the life science industry grew employment at 2.8% CAGR over 2011-2016 while turnover essentially was flat over the same period.

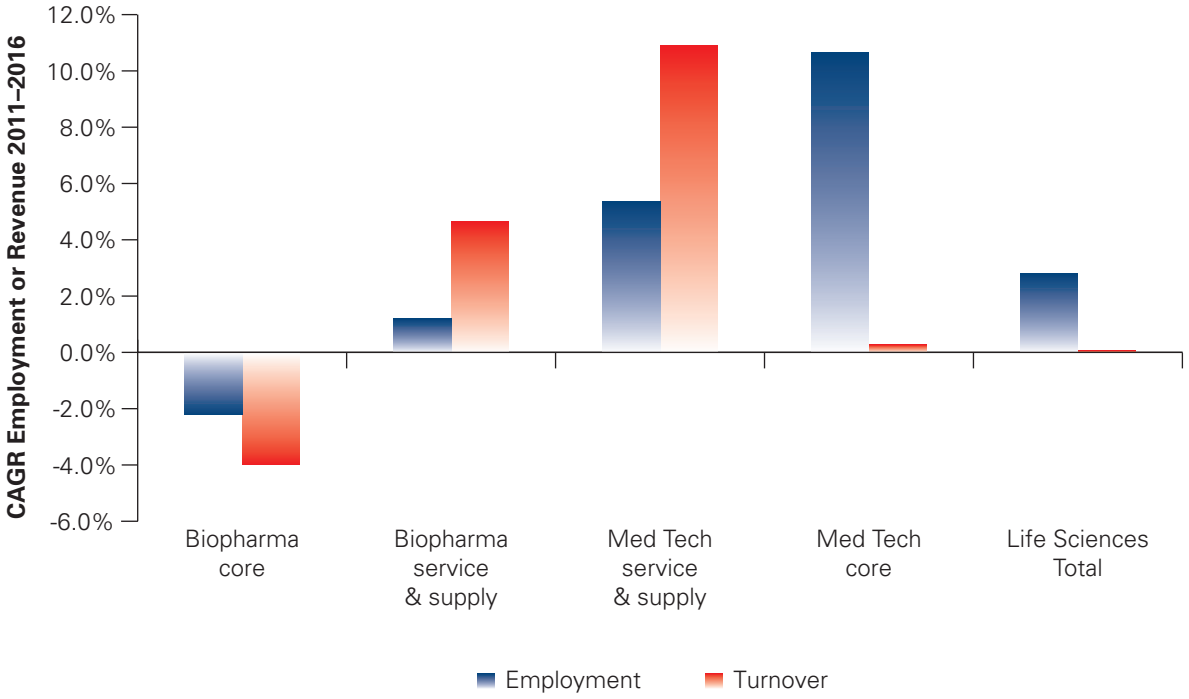
3.1.2 **Figure 7** shows the trends for the two Core and two Service & Supply sectors that make up the industry. The growth in industry employment is driven by strong growth in the overall Med Tech sector, particularly the Core Med Tech sector, where every segment showed a positive employment trend over the period. All of the segments with an increase in employment of over 1,000 between 2011 and 2016 are Med Tech Core segments and achieved growth rates between 9-20%. Lower overall employment growth in the Med Tech service & supply sector includes 7 segments where employment decreased although the largest employment sectors of contract manufacturing and research and reagents and equipment both showed modest growth of 3.6% and 1.1% respectively.

18 A full reconciliation of the changes in the 2016 versus 2015 datasets is given in Annex 1

3.1.3 The negative employment growth rates in the Core Biopharma sector is driven by large absolute decreases in the Small Molecules, Vaccines and Therapeutic Protein segments. All except 2 segments out of 18 in the Biopharma Service & Supply sector posted positive growth in employment.

3.1.4 From 2011 to 2016 industry turnover decreased at a rate of 0.1% CAGR caused by a decrease in turnover in the Core Biopharma sector and this latter decrease caused primarily by a decrease of 5.1% in Small Molecules, which is the single largest contributor to turnover for the industry.

Figure 7. *Growth trend in employment and turnover over 2011-2016 for the sectors of the life science industry*



3.1.5 To complement the compound annual growth rates, **Figure 8 & 9** show the year-on-year direction of change in employment and turnover for the industry sectors. Employment for the industry has risen every year except between 2011 and 2012 and every component sector has grown employment since 2014. The Core Med Tech sector has grown employment every year since 2011 in contrast to Core Biopharma decreases over 2011- 2013. The Med Tech Service & Supply Chain had decreases in employment over 2011 to 2014 followed by strong increases in the years to 2016 that resulted in a net emplyment increase of 335 people for companies in the trend data set.

Figure 8. *Direction of change in employment year-on-year between 2011 and 2016 for life science industry sectors*

	Direction of change in Employment between years				
Segment	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016
Biopharmaceutical core	↓	↓	↑	↑	↑
Biopharmaceutical service & supply	↑	↑	↓	↑	→
Medical Technology core	↑	↑	↑	↑	↑
Medical Technology service & supply	↓	↓	↓	↑	↑
Total life sciences	↓	↑	↑	↑	↑

3.1.6 The change in turnover between years shows a different pattern than employment with the decrease in turnover in Core Biopharma over 2011-2013 followed by increases. This pattern is mirrored in the Biopharma service & supply sector.

Figure 9. *Direction of change in turnover year-on-year between 2011 and 2016 for life science industry sectors*

	Direction of change in turnover between years				
Segment	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016
Biopharmaceutical core	↓	↓	↑	↑	↑
Biopharmaceutical service & supply	↑	↑	↓	↑	→
Medical Technology core	↑	↑	↑	↑	↑
Medical Technology service & supply	↓	↓	↓	↑	↑
Total life sciences	↓	↑	↑	↑	↑

3.2 Med Tech Sector Growth

3.2.1 Overall the Med Tech sector showed positive growth trends in both employment and turnover of 9.5% and 1.8% respectively over 2011-2016 based on the 1,379 companies in the trend data set. Growth in employment was particularly strong in Core Med Tech while turnover growth was strong in the service & supply sector. Employment for the whole sector grew every year while turnover decreased in one year between 2013/14 but grew in all other years.

3.2.2 As shown in **Figure 10** the 5 largest Core Med Tech segments by employment all had postive growth trends led by Digital Health. All

segments grew year-on-year over 2014-2016 and single use technology grew every year of the period. Based on real growth estimates, these segments grew employment between 2015 and 2016 by 2,100. The highest employment growth trends were seen in the Digital Health, Mobility Access and Drug Delivery segments.

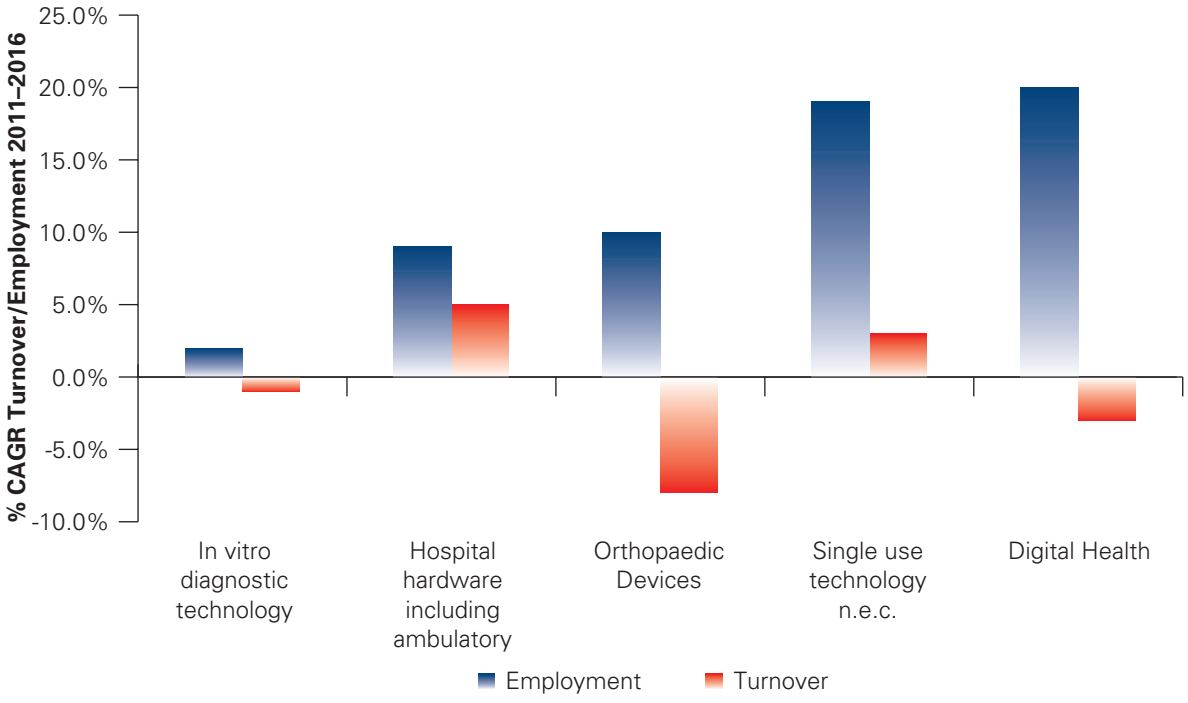
3.2.3 In contrast the turnover trends for the same largest employment segments shows a variable performance with some of the largest segments recording decreases in the turnover.

3.2.4 The Med Tech service & supply sector showed positive growth in both employment and turnover for the two largest segments; Contract manufacturing and Research, Reagents and Equipment. The Analytical Services segment showed the highest employment growth rate at 25%[19].

3.3 Biopharma Sector Growth

3.3.1 **Figure 11** shows the employment and turnover growth trends for the Core Biopharma segments and the service & supply chain. Over the period 2011-2016, Advanced Therapy Medicinal Products (ATMPs) was the only Core Biopharma segment that increased both employment and turnover. Both small molecules and vaccines saw a decrease in both turnover and employment and the detail shows that in the trend set these decreases were

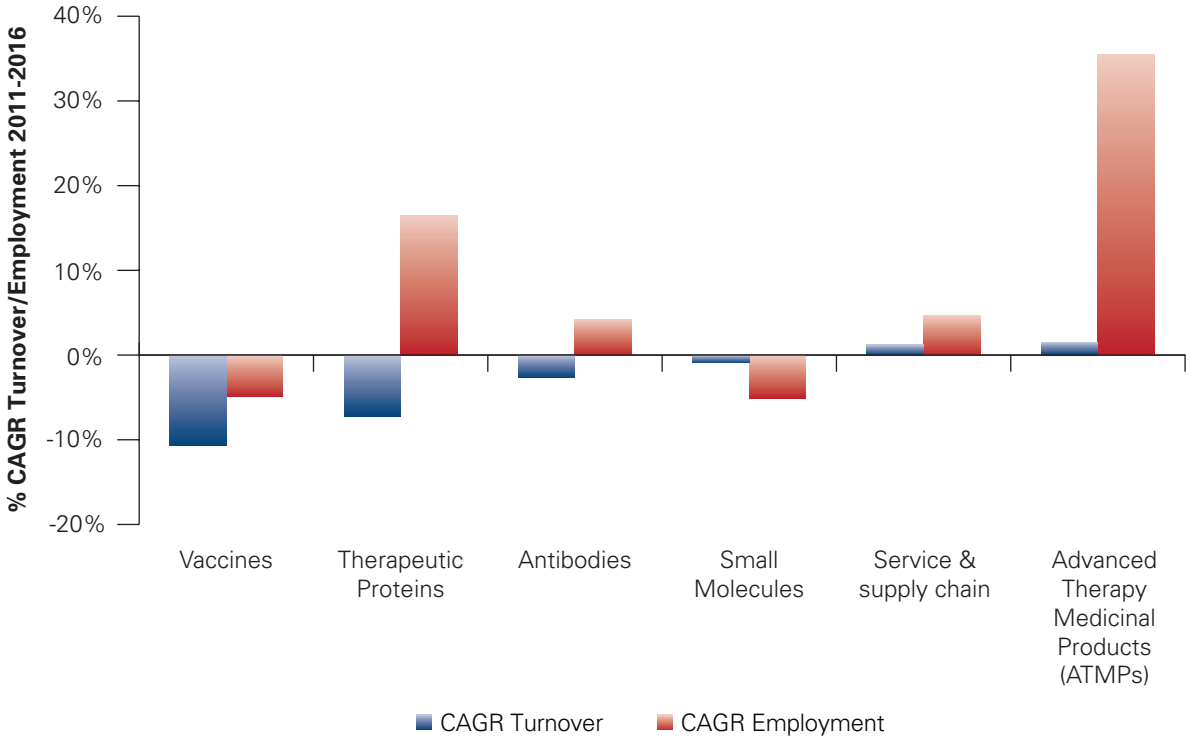
Figure 10. *Employment and turnover growth rates over 2011-2016 of the 5 largest Med Tech segments by employment*



19 Out of segments with trend sets that contain more than 10 companies

3.3.2 concentrated in a small number of large companies with the majority of the employment decreases seen over the 2011 to 2013 period. The real growth analysis data for employment changes over 2015 to 2016 shows an increase in employment in all segments except blood & tissue. The total like-for-like increase was 1,030 employees.

Figure 11. *Employment and turnover growth rates over 2011-2016 for the Core Biopharma segments and the service & supply sector*



Chapter 4

Digital Health and Genomics

4.0.1 In this section we look at the digital health and genomics economic activity based on the information in the database. The digital health sector in this analysis covers companies that that develop and market software and/or devices that rely on software for their key functionality. These products are used in hospitals and GP surgeries, in the home to manage health or deliver services and in areas such as drug development (e.g. clinical trials or data analysis). The focus is on software that has high medical information content and is validated.

4.0.2 The genomics segment is a cross industry segment and has been analysed by adding an additional coding to a company independent of the primary sector and segment coding. For example a company can be coded in the Med Tech Service & Supply sector under the reagent and equipment segment and have an additional genomics coding under Sequencing Instruments.

4.1 Digital health

4.1.1 The digital health segment[20] within Core Med Tech is the 5th largest in terms of employment in the UK life sciences sector with strong growth potential. The global market for digital health was worth £23bn in 2014 and is expected to almost double to £43bn by 2018[21]. The following section looks at this segment in more detail.

4.1.2 The digital health segment has a total of 427 companies the second highest of all segments in the life science industry. The segment employs 9,600 employees and has a total turnover of £1bn, one of only 13 segments in the life science industry with a turnover over £1bn and the fifth largest in the Core Med Tech sector. The estimated turnover and employment includes only companies where a significant proportion (over 20%) of their economic activity is in Digital Health. This approach does not include all the economic activity associated with, for example, large diversified companies where digital health is not their main activity.

4.1.3 Within Core Biopharma and Med Tech, there are more companies in the Digital Health segment than any other life science segment except Small Molecules (Biopharma) and Assistive Technologies.

20 See Annex 4 for a description of sub-segments used to further analyse this segment
21 From 2015 Deloitte study for the Office of Life Sciences on the digital health industry

4.1.4 Analysis of growth shows that between 2011 and 2016, the 51 companies[22] in the trend data set grow employment at 20% CAGR the third highest rate of all Core Med Tech segments. Over the same period, turnover showed a decline of 3.5% with growth over 2011-2013 followed by a decline in 2014-2015. Based on the data for real growth between 2015 and 2016 digital health companies had the third largest increase in employment, adding an estimated 940 jobs while the turnover showed a small decrease.

4.1.5 Of the companies where the formation date is known, 200 out of 427 (47%) of digital health companies were formed in the last 10 years and 109 out of 427 (26%) in the last 5 years.

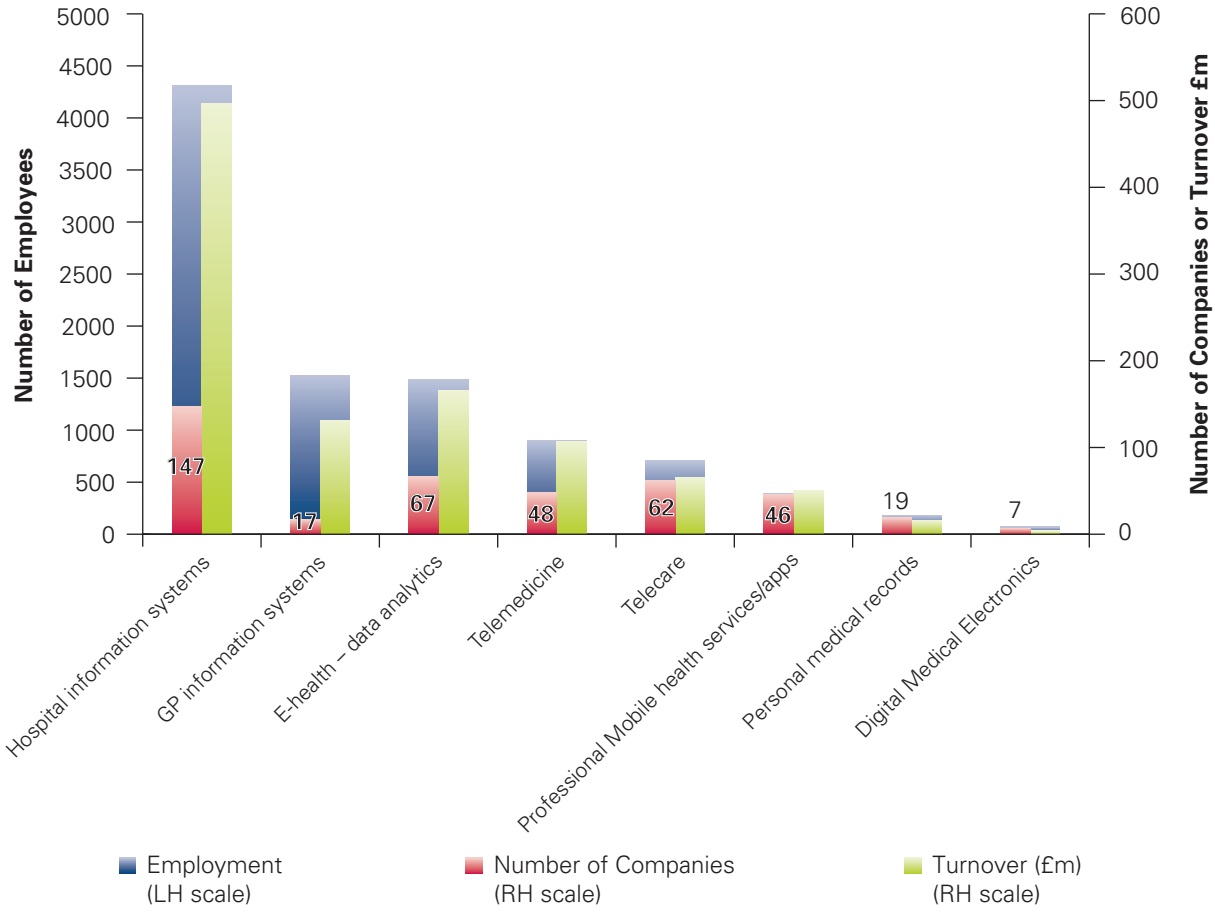
4.1.6 Analysis of the breakdown of the sector shows that within Digital Health, Hospital Information Systems accounts for the most companies, turnover and employees representing 4,316 (45%) of all employment. The GP information system and E-health analytics are the second largest segments both employing an estimated 1,500 people although the E-analytics sub-segment has the higher turnover and more companies.

4.1.7 Analysis of the size of companies shows that 60% (255) of digital health companies are micro with less than 5 employees and 58% (249) have turnovers less than £250,000. The hospital information sub-segment has 18 companies with a turnover greater than £5m, which is 49% of all companies of this size in this sub-segment, although it has only 6 companies with more than 250 employees.

4.1.8 **Figure 12** shows the distribution of employment, turnover and number of companies across the 8 digital health sub-segments that employ more than 50 people.

22 The digital health trend set of companies represent 28% of the segment employment and 25% of turnover

Figure 12. *The distribution of employment, turnover and number of companies across the Digital Health sub-segments (only for sub-segments that employ more than 50 people)*



4.1.9 Geographical analysis shows that London has the most Digital Health companies followed by Yorkshire and the Humber and the South East of England. Employment shows the same distribution and these 3 regions are the only ones that employ more than 1,000 people. These 3 regions also generate the highest individual turnovers and in total £0.7bn (46%) of segment turnover. **Figure 13** shows the geographical distribution of economic activity in the Digital Health segment.

4.2 Genomics

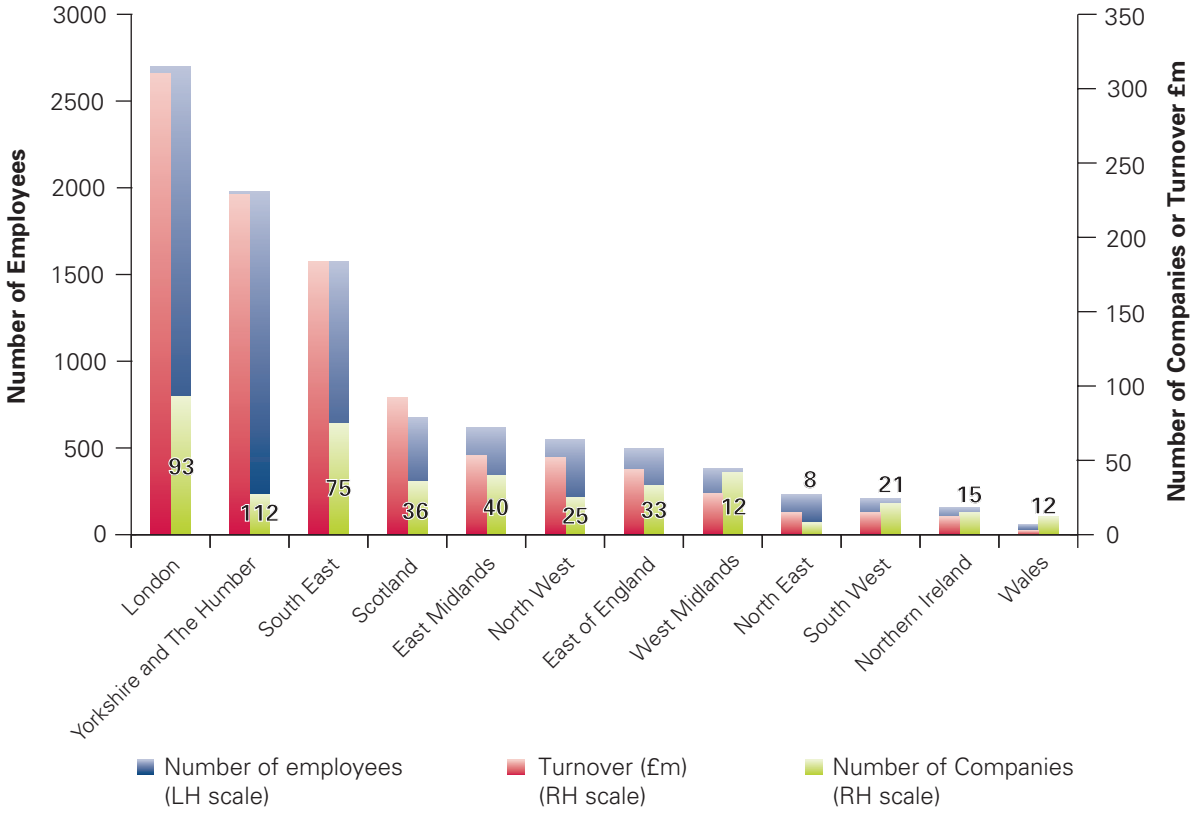
4.2.1 Genomics is an interdisciplinary field of science and technology focused on the study of genomes. In this analysis the focus is on the study of the human genome and the application of the resulting knowledge to human health. Since the instigation of the Human Genome project in 2001, the field and its applications have grown. The market for equipment, reagents and services based on genomics is estimated at £8bn and is forecast to grow rapidly[23].

23 Genomics in the UK, Deloitte study for the Office of Life Sciences, Sept 2015

4.2.2 Overall genomics related activity in the UK has 44 companies with 1,800 employees and a total turnover estimated at £1bn[24].

4.2.3 Analysis of the companies involved in genomics shows the majority (80% or 35) are involved in sequencing and application activities. The largest turnover and employment is in companies developing and selling sequencing equipment and/or services.

Figure 13. *The distribution of employment, turnover and number of companies for Digital Health across the UK*



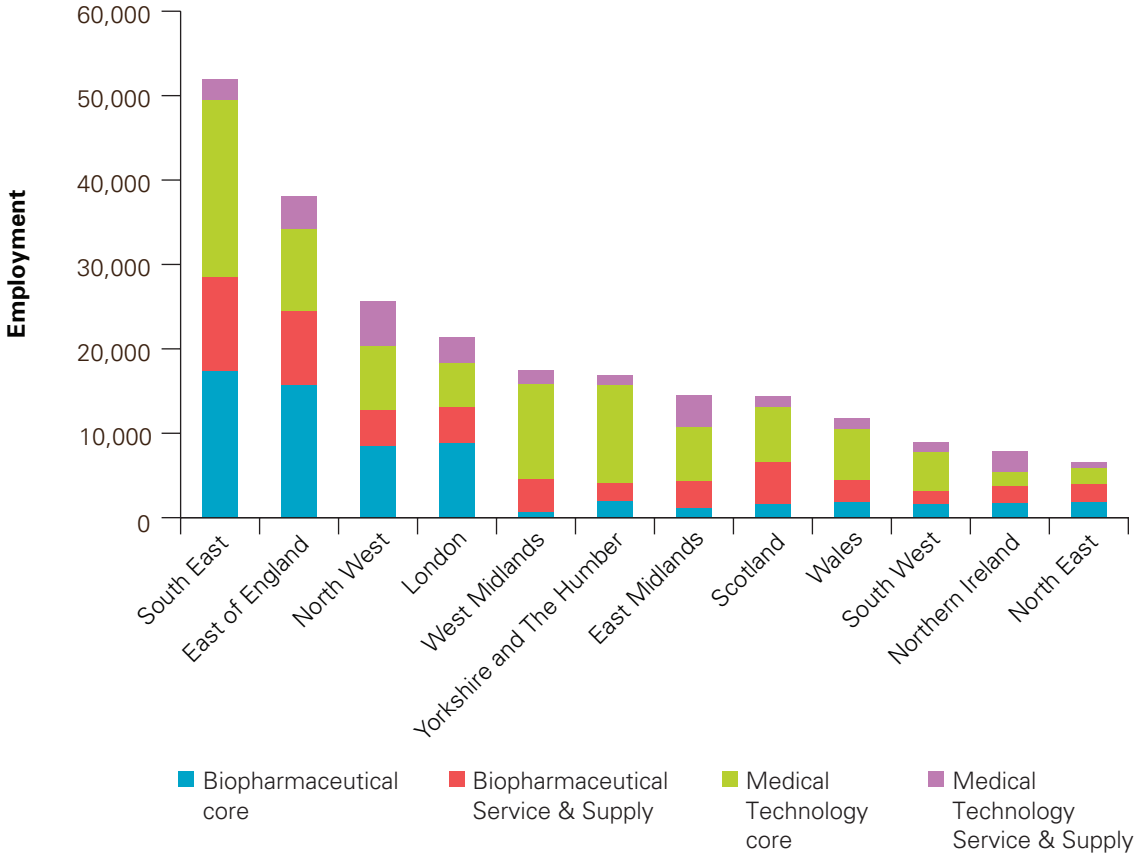
24 The economic activity is based primarily on companies that have the majority of their activity in the sector either selling equipment, reagents or services. The analysis does not include in-house use or application of genomics for example for drug discovery & development

Chapter 5

Geographical Analysis

5.0.1 The records within the database are all associated with postcode location to enable the distribution of employment and turnover to be estimated at individual companies locations including those with multiple sites. Where available, we have validated employment data for the large companies by looking at information such as annual reports or websites to identify the number and types of employment. The primary allocation of turnover to location is based on the legal entity information sourced from third party databases, validated for large companies from annual accounts. This method of turnover reporting is used throughout the document. An alternative geographical allocation of turnover is shown in Annex 3 by factoring the employment at a location by the average turnover/employment ratio for the individual segment for that site or company.

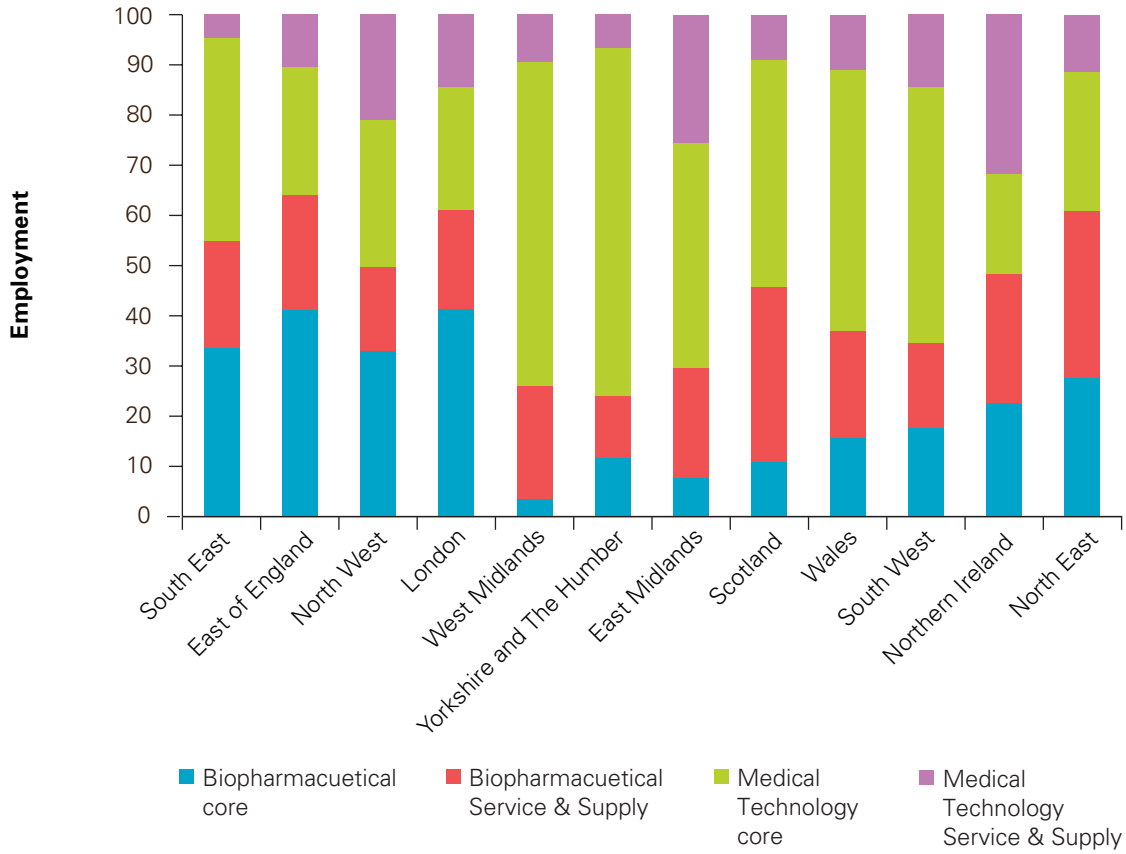
Figure 14. *The distribution of the industry employment by sector across the regions of England and in Northern Ireland, Scotland and Wales*



5.0.2 The South East of England contains the largest population of life science industry jobs and the largest number of Core Biopharma and Med Tech jobs. This region combined with the East of England contains 90,000 (39%) of all the life science industry employees. The North West of England is the 3rd largest region in term of employment with significant employment in the Core Biopharma and Med Tech sectors.

5.0.3 An alternative presentation of the regional employment data is shown in **Figure 15** where the data is presented as a percentage of the total life science employment in that region. This analysis shows which sectors are dominant within a region. For example the Core Med Tech sector has the highest proportion of life science jobs in the West Midland and Yorkshire and the Humber regions, whereas in the London, the Core Biopharma sector has the largest proportion of life science employment.

Figure 15. *Regional employment in the life science sector displayed as a percentage of the total life science employment in the region*

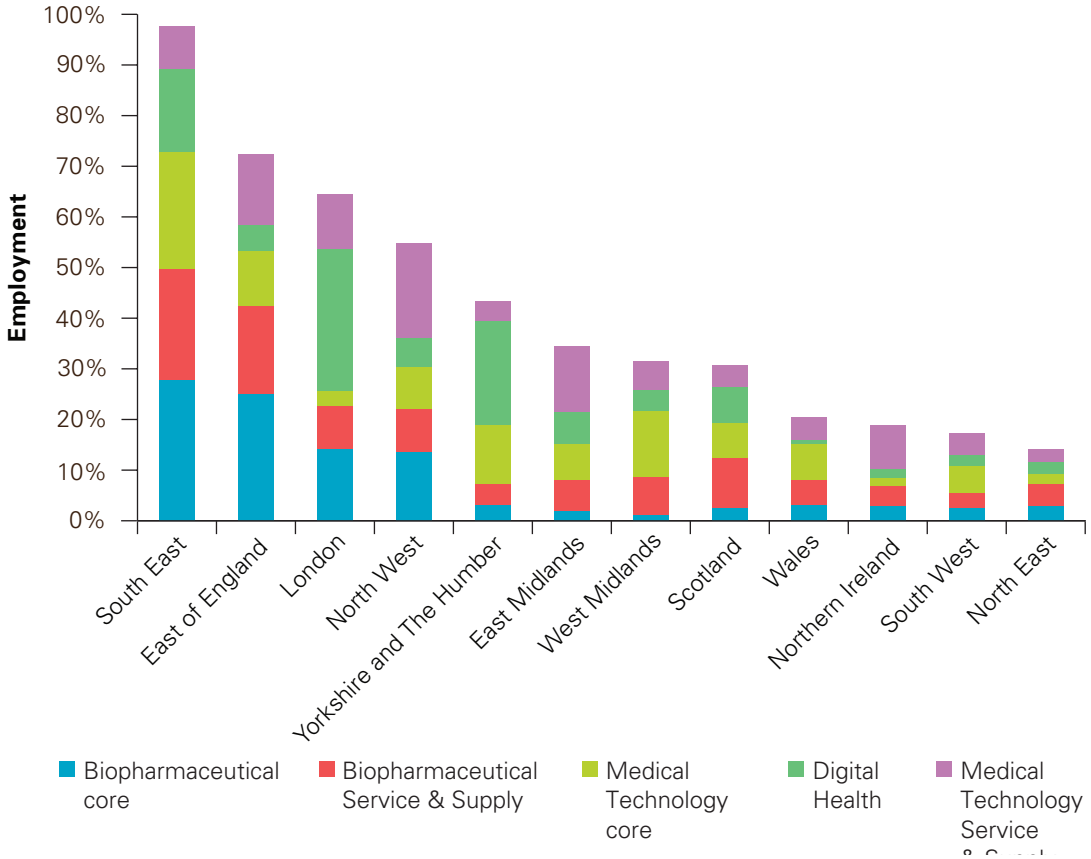


5.0.4 An alternative view of the relative distribution of all life science sectors and the digital segment employment is shown in **Figure 16** and highlights:

- The concentration of Core Biopharma in the South East, East, North West of England and London;
- The concentration of Core Med Tech in South East of England, West Midlands and Yorkshire and the Humber;

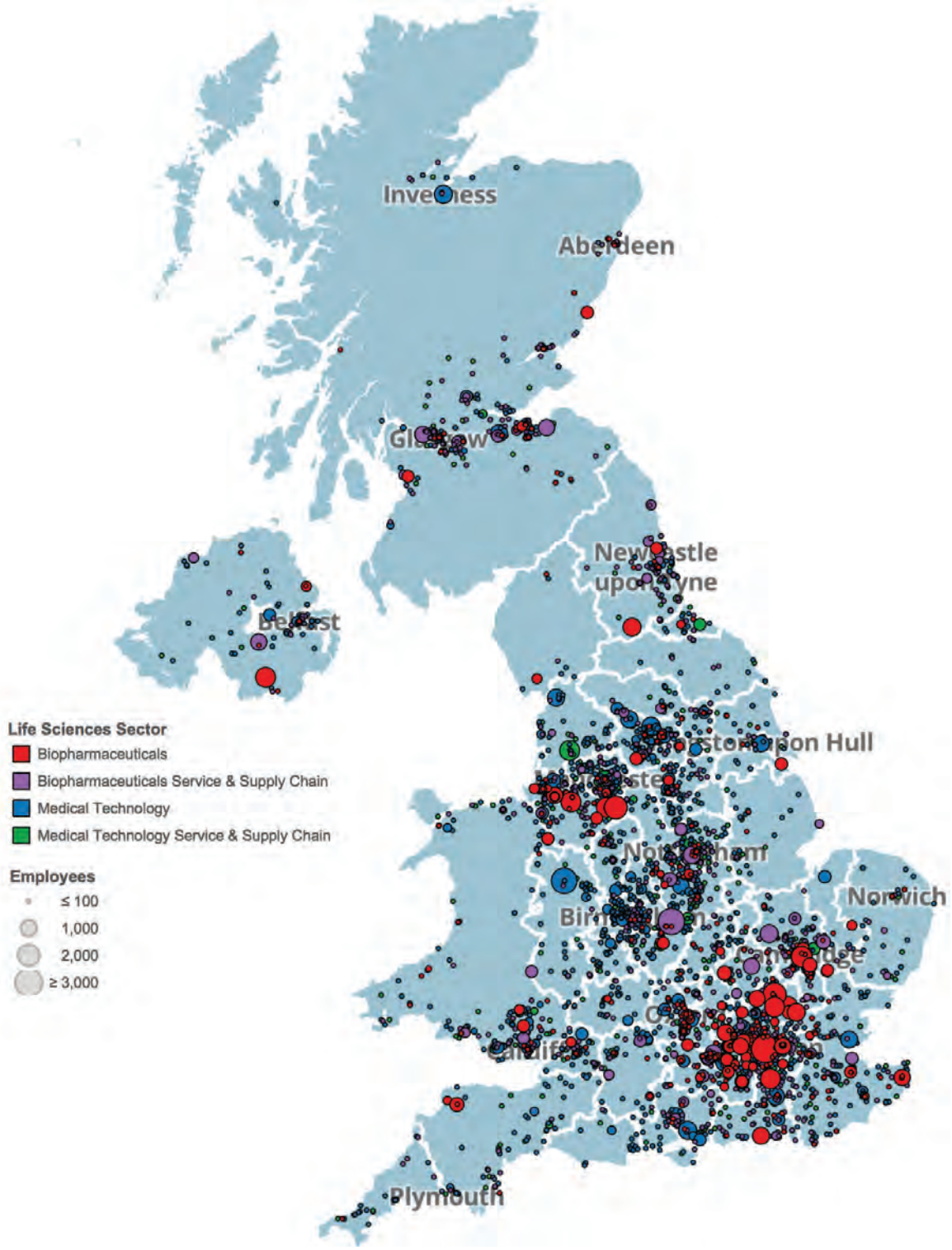
- The concentration of Biopharma Service & Supply in the South East and East of England and Scotland;
- The concentration of Med Tech Service & Supply in the North West, East of England and the East Midlands; and
- The concentration of the Digital Health segment in London, the South East of England and Yorkshire & the Humber.

Figure 16. *Distribution of Biopharma and Med Tech employment by region expressed as a % of total UK sector employment*



5.0.5 **Figure 17** represents the employment information for the life science sector in a map format with concentrations of employment highlighted. The representation shows the clustering of the employment around major cities in England, Northern Ireland, Scotland and Wales in common with a number of industries. The map also highlights the more dispersed geography of the Core Med Tech sector compared to the Core Biopharma sector, with the latter showing concentrations in the London-Oxford-Cambridge corridor and in the North West. The service & supply sectors of the industry are also more widely distributed across the UK, although the Biopharma service & supply chain has significant concentrations in the South East and East of England and in Scotland.

Figure 17. *Map of the life science sector employment in the UK*



5.1 Biopharma Geographical analysis

5.1.1 The Core Biopharma sector has a concentration of economic activity in four regions of England. Of the 704 companies and sites in the sector, 522 are located in the South East, East, North West of England and London. Together these four regions contain 80% of all employment and account for 90% of the turnover in the sector. For all regions, the distribution of the turnover follows that of employment.

5.1.2 The Biopharma service & supply sector is more distributed across the UK with the top 4 largest regions by employment employing 57% of the total for the sector. For the majority of the regions, the Contract Manufacturing and Research segment is the largest contributor to employment, the exceptions are: the South East of England where Clinical Research organisations make up the largest proportion; London where Analytical Services is the largest; and the Midlands and the South West where Reagent and Equipment suppliers make up the largest employment. The large turnover in the West Midlands is concentrated in the Reagents and Equipment segment.

5.1.3 The map of Biopharma sector employment shows more detail on the location of employment within the regions, highlighting the focus of Core Biopharma employment along the London-Oxford-Cambridge, Manchester-Liverpool and Edinburgh-Glasgow corridors.

Figure 18. *Regional employment, turnover and number of companies for the Biopharma Service & Supply sector*

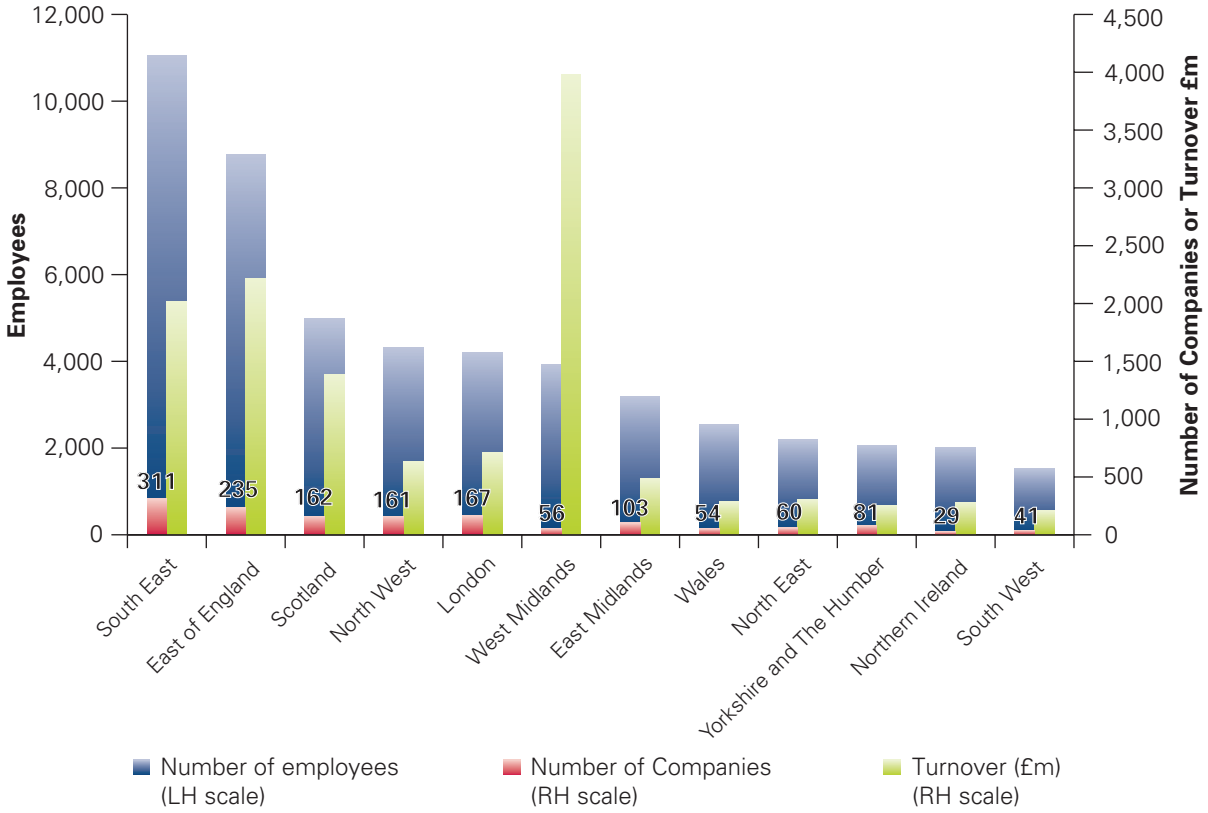
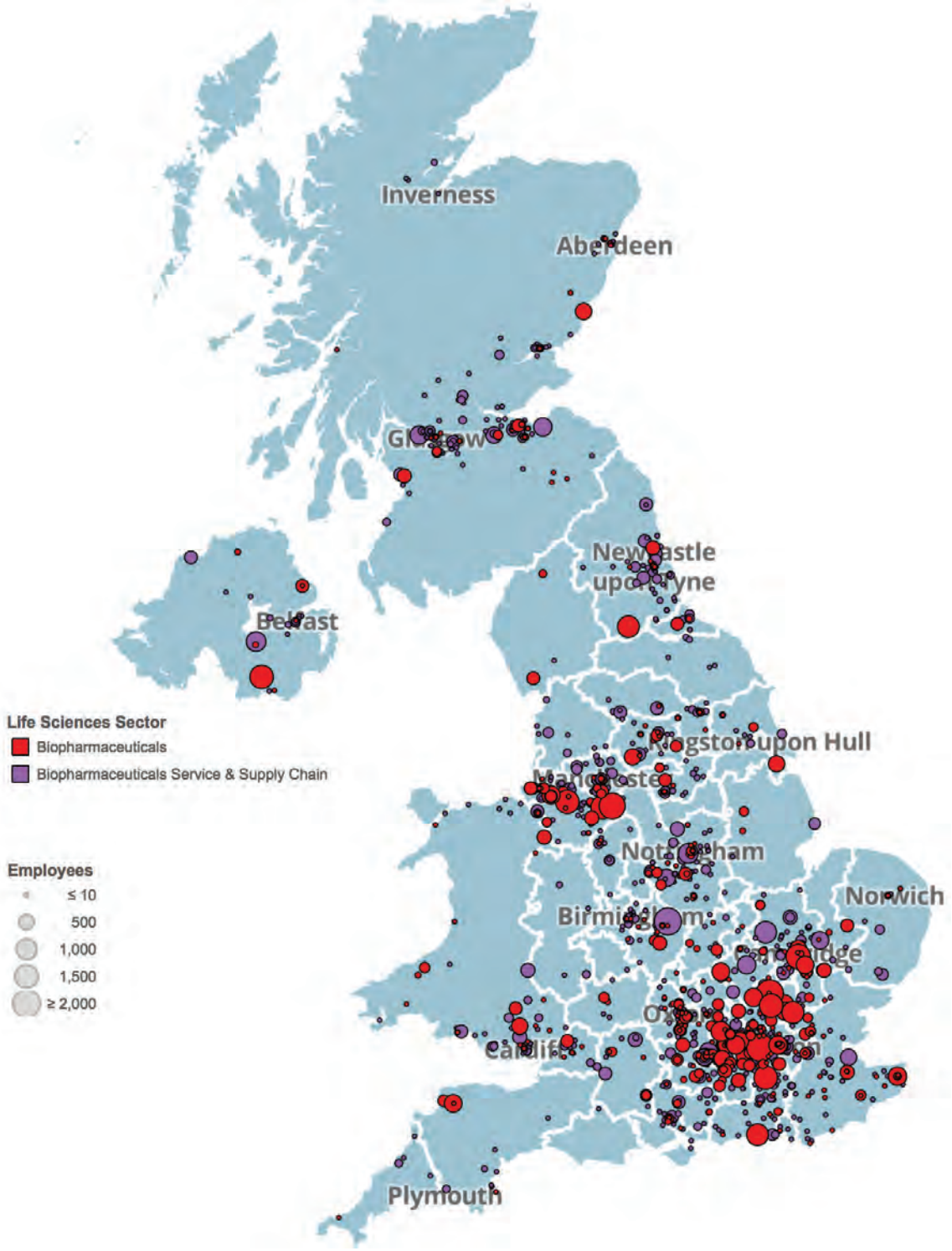


Figure 19. *Map of the Biopharma sector employment in the UK*



5.1.4 An analysis of the composition of Biopharma companies by region shows that only the East and South East of England have high proportions of all sizes of companies from micro to large. London has a high percentage in the range 0-49 employees and the North West of England has a high percentage of companies in the 20-249 employee range.

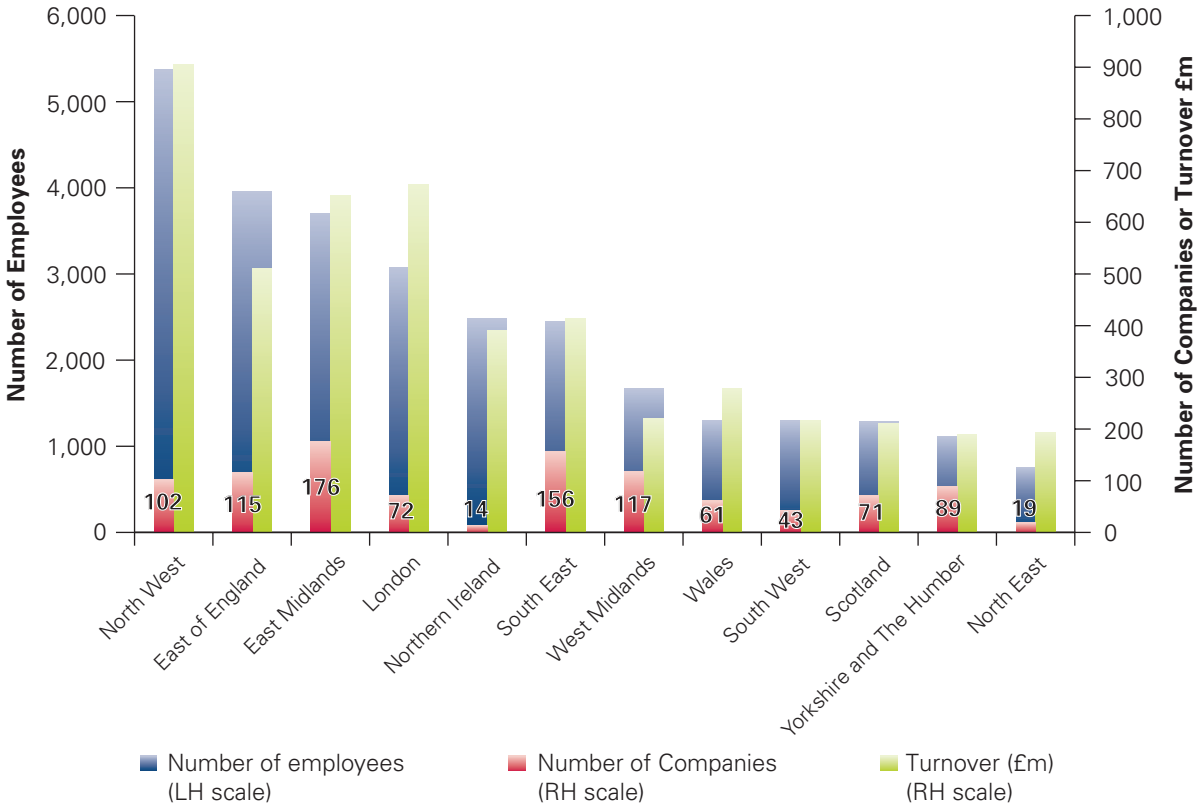
5.1.5 Analysis of the number of companies that were formed in the last 10 years by region shows that the South East of England followed by the East of England, London and Scotland have the highest percentage of the total of 825 Biopharma sites and companies with dates of incorporation between 2007 and 2016 inclusive (52%).

5.2 Med Tech Geographical Analysis

5.2.1 The Core Med Tech sector has a concentration of economic activity in four regions of England. Of the 2,843 companies and sites in the sector 1,771 are located in the South East and East of England, the Midlands and Yorkshire and the Humber. Together these four regions contain 54% of all employment and turnover in the sector.

5.2.2 Analysis of the Med Tech Service & Supply sector distribution of employment shows the North West and East of England followed by East Midlands and London as having the highest concentration. For the majority of the regions the reagent and equipment suppliers make up the largest group of employers. All regions have high proportions of employment in contract manufacturing and research companies with the East of England having the highest number of employees in this segment.

Figure 20. *Regional employment, turnover and number of companies for the Med Tech Service & Supply sector*

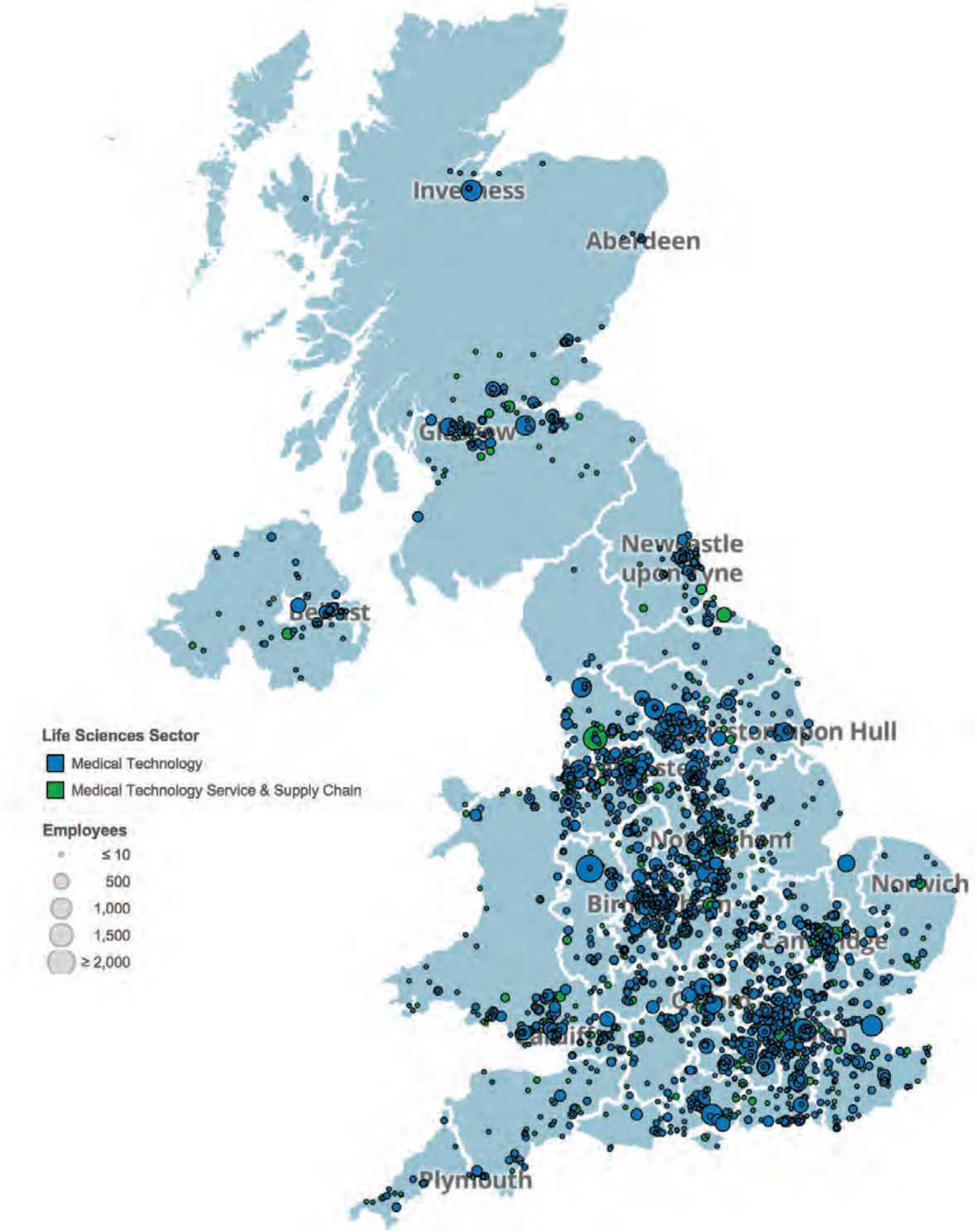


5.2.3 The map of Med Tech sector employment shows more detail on the location of employment within the regions, highlighting the economic clusters in the Liverpool-Manchester-Leeds corridor and south to Sheffield-Nottingham and west to Birmingham. Other significant clusters are present around London and in the Edinburgh-Glasgow corridor.

5.2.4 An analysis of the composition of Med Tech companies by region shows that only the South East of England and the Midlands have high percentages in all sizes of companies measured by employee numbers (from micro companies with under 5 employees to large companies with over 250 employees).

5.2.5 Analysis of the number of companies that were formed in the last 10 years by region shows that the South East of England followed by the Midlands, London and the North West of England have the highest numbers of companies formed since 2007. Together these regions account for 53% of all companies formed over this period.

Figure 21. *Map of the Medical Technology sector employment in the UK*



Annex 1

Data Quality and Methodology

A1.1 Data quality statement – while not official statistics, we aim to collect data and present this report in line with principles of the Government Statistical code[25] as well as build the reliability of data in the sector.

A1.2 **Principle 1: Meeting user needs –** Since the previous publication we undertook a significant methodology review engaging with users to ensure the data collection remains relevant and useful. We publish data at the level of Local Enterprise Partnerships (LEPs) which are key users of the data.

A1.3 **Principle 2: Impartiality and objectivity** – Data is collected, processed and quality assured by an independent contractor. The next section looks at the impacts of recent methodology changes, transparently presenting their impact.

A1.4 **Principle 3: Integrity** – In this report we present data in a transparent way, commenting objectively on life science industry sector trends.

A1.5 **Principle 4: Sound methods and assured quality** – Significant quality assurance by the contractor, BIS analysts and OLS. Issues of methodology are identified and explored in this report.

A1.6 **Principle 5: Confidentiality –** We publish the maximum amount of data possible without revealing any data provided to us under license.

A1.7 **Principle 6: Proportionate burden –** The data collection is based on analysis and collation of secondary data sources (e.g. company accounts) to ensure we do not impose a burden on businesses in the life science sector.

A1.8 **Principle 7: Resources** – Significant financial and administrative resources are employed to enable this data collection and development of this report.

A1.9 **Principle 8: Frankness and accessibility** – The aim is to provide objective commentary on life science sector trends, presenting the data in an accessible way using a range of graphical presentations.

A1.10 Real growth or like-for-like growth between 2015 and 2016 is calculated by removing changes in employment or turnover associated with the addition of companies that were formed more than 12 months before the update and

25 https://www.statisticsauthority.gov.uk/wp-content/uploads/2015/12/images-codeofpracticeforofficialstatisticsjanuary2009_tcm97-25306.pdf

not previously in the 2015 dataset. Data for companies that are re-classified as not in scope (NIS), duplicates or those were previously classified as ceased trading but now trading are also excluded. **Table 1** shows data used for the calculation of real or like-for-like growth.

Table 1. *Breakdown of the employment and turnover differences between the 2015 and 2016 datasets including the elements that make the calculation of real or like-for-like growth.*

Class of change	Type of data	UK companies and sites	Employees	Turnover £'000
Total active 2015	As reported last year	5,626	221,903	59,013,527
Total active 2016	Reported this year	6,042	233,401	63,467,744
	Difference	**416**	**11,498**	**4,454,247**
Breakdown on Absolute difference				
Company births	Real change	57	77	10,367
New old – new sites for existing companies	Real change	13	1,898	5,187,783
Trading	Real change		3,481	1,201,272
Restructuring/ recording change	Real change		4,003	-2,393,615
Company Deaths this reporting year	Real change	-199	-1,469	-282,289
Site closures this reporting year	Real change	-9	-235	-89,945
		Total Real Change	**7,755**	**3,633,573**
			3.5%	**6.2%**
New old – companies	Excluded from real change	618	6,012	1,269,220
Terminated NIS, duplicates	Excluded from real change	-67	-2,445	-479,862
Previously reported dead, now trading	Excluded from real change	3	176	31,316
	Reconciled totals	**416**	**11,498**	**4,454,247**

Annex 2

Full Data partners acknowledgement statement

A2.1 The Office for Life Sciences gratefully acknowledge the contribution of the following regional and national organisations in the compilation of the Bioscience and Health Technology Database.

A2.2 The content of the database has been derived from a variety of proprietary data sources which have been provided under license. The Department for Business, Energy and Industrial Strategy would like to acknowledge the assistance given by the owners of these data sources.

A2.3 Business Information was accessed under license by Dun & Bradstreet Limited and the FAME database from Bureau van Dijk Electronic Publishing.

A2.4 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 Kepier & Company Ltd and Lindum Research (data integration and analysis).

Data Partners

- Association of British Healthcare Industries (ABHI)
- Association of the British Pharmaceutical Industry (ABPI)
- AXREM
- BioIndustry Association (BIA)
- Bionow
- Biosciences Knowledge Transfer Network (KTN)
- British Healthcare Trade Association (BHTA)
- British In Vitro Diagnostics Association (BIVDA)
- HealthTech and Medicines Knowledge Transfer Network (KTN)
- Innovate UK
- Invest Northern Ireland
- Medcity
- Medilink East Midlands

- Medilink West Midlands
- MediWales
- OBN
- One Nucleus
- Scottish Enterprise
- SEHTA
- South East Health Technologies Alliance
- TechUK
- Welsh Assembly Government

Annex 3

Summary of Methodology

A3.1 Each company and their individual sites are segmented depending on the main type of final medicinal product or device produced. The latter companies are designated "Core" companies to distinguish them from companies that are active only in the service and supply chain.

A3.2 Within the database codes are used to allocate companies and sites to one or more segments. Where a company has products that fall in more than one category these are all coded, however in the analysis of the data only the code that represents the majority of a company's activity is used.

A3.3 Segmentation was reviewed for all companies and sites in the 2014 update and during the 2015 update a number of the companies that have large contributions to employment and turnover were reviewed for segmentation and their turnover in scope (TOS).

A3.4 Additional segmentation codes are used to further classify company activities by both product type and business activity. For example in-vitro diagnostics is further segmented into in-vitro diagnostic products that involve clinical chemistry, immunochemistry etc. The business activity codes are used to code companies and sites dependent on whether they under take R&D, manufacturing, service & supply (of their products) and sales/ distribution (of their products).

A3.5 The codes for each sector containing Core companies are shown in the following tables In contrast to all previous years, from the 2015 update onwards the Pharmaceutical and Medical Biotechnology sectors have been combined into one sector – Biopharma.

A3.6 The service and supply chain sectors that serve the Biopharma and Med Tech sectors are coded with the prefix BP and MT respectively followed by the appropriate number to define the type of service or supply.

A3.7 Standard Industry Classification (SIC) codes are used to classify companies by industry in administrative statistics. This was last updated in 2008[26]. This classification system has categories for companies whose primary activity is the manufacture of pharmaceuticals, types of medical equipment, and those whose primary activity is biotechnology R&D but does not allow us to identify the full range of health life science companies. Industry segmentation based on this wider range, specifically to be used in the

26 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/455263/SIC_codes_V2.pdf

database, was defined with the assistance of the Data Partners and is summarised in Annex 4. This is the classification system used in this report. We have analysed the SIC codes of the companies within the database and this shows a wide span of codes, reflecting the on-going need for this report and for the Health Life Science database for describing and analysing the health life science industry. The additional benefit of the approach of the health life science database is the ability to make a more granular assessment of the sector, including growth rates and trends. For example, this is the only source of definitive information that shows employment and growth rates in digital health or allows us to understand the growth of advanced therapy medicinal products.

A3.8 Data on turnover and employment is mostly obtained through obtaining figures for each site from either Dun & Bradstreet or FAME. The turnover figures will include turnover on the sale of products wholly or partially manufactured outside the UK. (Note: the year referred to is the year of the update rather than the year of the turnover and employment figures; turnover and employment are for the latest 12 months available. For the majority of sites, these figures will have been derived from latest accounts submitted by companies to Companies House; the figures may be submitted up to 9 months after the end of the accounting period (which itself may vary between companies).

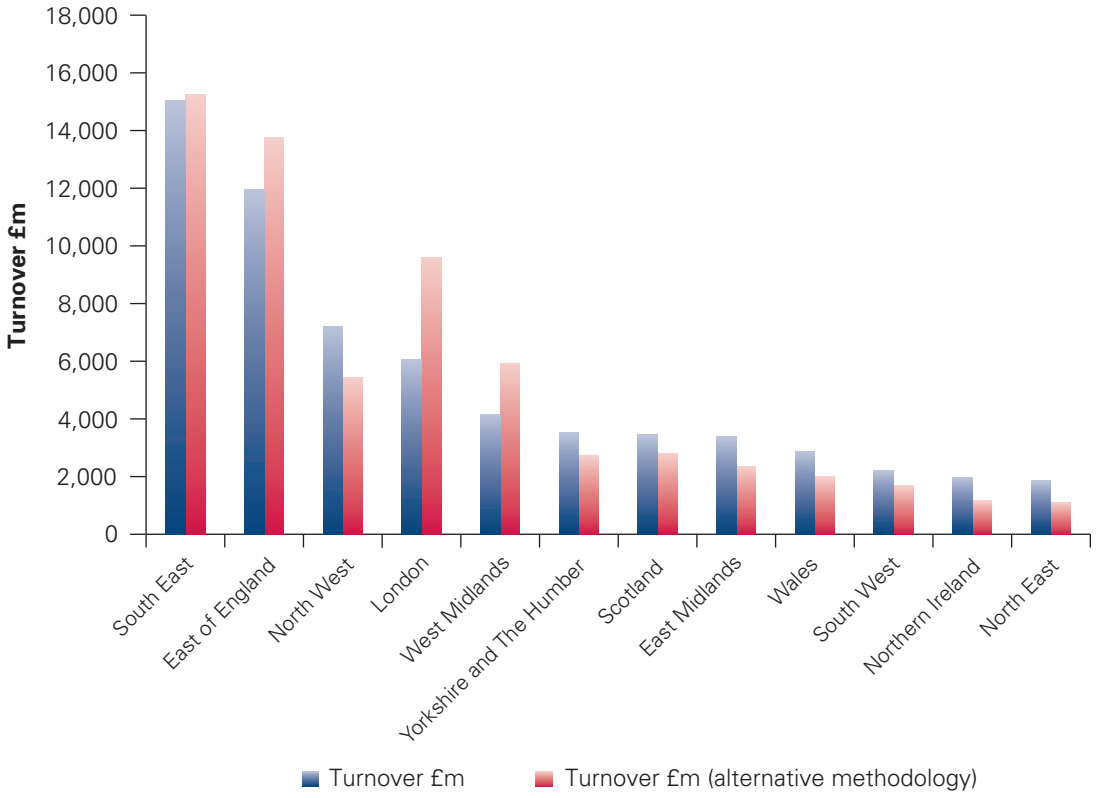
Table 2. *Turnover, employment and number of enterprise data based on the SIC codes used that cover the main sectors in the life science industry.*

SIC code description	Number of Enterprises	Employment	Turnover £m
Manufacture of Basic Pharmaceuticals and Pharmaceutical products	573	37,100	14,018
Manufacture of Irradiation, Electromedical and Electrotherapeutic Equipment	125	4,400	1,425
Manufacture of Medical and Dental Equipment and Supplies	1,999	40,400	4,623
Research and Experimental Development on Biotechnology	701	8,100	442
Total identifiable Life Sciences	**3,398**	**90,000**	**20,508**

A3.9 The geographical distribution of industry turnover is based on the information from third party data sources that has site based financial data that may not correlate directly with the economic activity at that location. For example, a company can, within its legal structure, place turnover in a sales legal entity based at its company HQ location. An alternative regional allocation of turnover is to factor employment at a location by the average segment

turnover/employment ratio. **Figure 22** shows this alternative method of allocating regional turnover for the life science industry compared to the primary method. This shows on average a 38% difference per region however, with limited effect on the rank order of the regions. Using the alternative method, the South East and East of England would still be the two largest, with the North West of England moving up to 3rd place and Yorkshire & The Humber moving up one place from 7th to 8th.

Figure 22. *Geographical distribution of Life Science industry turnover based on factoring of regional employment compared to the primary allocation methodology*



Annex 4

Biopharma and Med Tech segmentation

Biopharma	
Code	**Description**
BPA	Antibodies
BPB	Therapeutic Proteins
BPC	Advanced Therapy Medicinal Products (ATMPs)
BPD	Vaccines
BPE	Small Molecules
BPF	Blood and Tissue Products
PBX	Supply Chain

Service & Supply Chain	
Code	**Description**
X1	Clinical Research Organisation
X2	Contract Manufacturing/Research Organisation
X3	Contract Formulation Manufacturing
X4	Assay developer
X5	Analytical Services
X6	Formulation/Drug delivery specialist
X7	Reagent, Equipment and consumables supplier
X8	Regulatory Expertise
X9	Patent and Legal specialist
X10	Logistics and Packaging
X11	Information systems specialists
X12	Tissue and Biomass
X13	Specialist consultants
X14	Contract design
X15	Training
X16	Recruitment
X17	Investment Companies
X18	Healthcare services

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	Opthalmic 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
MTP	Implantable devices nec
MTQ	Assistive Technology
MTR	Mobility Access
MTS	Hospital hardware including ambulatory
MTT	Digital Health
MTV	Education and Training
MTX	Supply Chain

Digital Health			
Sub-segment code	**Short Description**	**Long Description**	**Deloitte segment or example**
MTT1	Hospital information systems	Secondary health system-held medical record systems are electronic versions of traditional paper records – often abbreviated to EHR. Includes provider-provider communication systems, e-prescribing	Digitised Health systems – provider held digital records
MTT2	GP information systems	Primary health system-held medical record systems are electronic versions of traditional paper records – often abbreviated to EHR. Includes provider-provider communication systems, e-prescribing	Digitised Health systems – provider held digital records
MTT3	Social Alarms/ Communications devices//bed-nurse call	Telecare - support and assistance provided at a distance using ICT, such as fall alarms and medicine management delivered over hardline or mobile platforms	Telehealthcare - Telecare
MTT4	Personal medical records	Systems for patients to hold their own medical information	Digitised Health systems – patient held digital records
MTT5	Telemed (medical monitoring) and telediag	Telehealth - the remote exchange of clinical data between a patient and their clinician delivered over hardline or mobile platforms. Includes video consultation and remote monitoring of health parameters such as blood pressure.	Telehealthcare - Telehealth
MTT6	E-health – data analytics	Software and infrastructure to enable analysis of health and medical Big data. Applications included: To support clinical decision-making: enabling clinicians to make evidence-based clinical decisions about patient care. Pathway design: using population level analysis to help redesign clinical pathways. Commissioning: developing standard frameworks and models for innovative commissioning/funding using patient outcomes and resource utilisation data for new and existing treatments. Drug assessment: the long term use of real world evidence to support drug development and approval. Performance management: prioritising resource allocation and measuring key performance metrics to better manage finances within the healthcare system. Evidence based learning: using analytics to more effectively share best practice.	Heath Analytics – data analytics
MTT7	Digital Medical Electronics	Devices that conduct monitoring of body activity internal or externally, are wireless and incorporate sophisticated software that involves enables a high degree of operation independent of human intervention	e.g. Proteus digital pill, imaging pills, predictive intensive care monitoring stations (algorithms predict impending crisis).
MTT8	Professional Mobile health devices	Mobile devices that are applied in a clinically setting (can include embedded software or interface with independent software)	mHealth – applications – medical apps e.g. wearable electrocardiogram worn by patient at home for periods of days to detect heart arrhythmias
MTT9	Professional Mobile health services/apps	Clinically-led apps that manage medium to high confidentiality data (health data and personal medical records); these are used by clinicians, patients or hospital system reporting to aid prevention, diagnosis, and/or monitoring of disease	mHealth – applications – medical apps
MTT10	Consumer Mobile health devices	Consumer-led fitness and wellbeing devices that monitor basic body functions such as activity levels, heart rate and blood pressure	mHealth – wearables , applications -wellness/ fitness
MTT11	Consumer Mobile health services/ apps	Consumer-led fitness and wellbeing apps that handle low-confidentiality data (personal wellness and activity data) and are usually a consumer-driven purchase, includes services to store consumer data in the cloud and provide health advice based on the data	mHealth – wearables , applications -wellness/ fitness

Genomics				
Main	**Main Value chain**	**Description**	**Sub-tag code**	**Sub-tag chain activity**
Tagging code	**Activity**			
GenA	Sampling	The process of collecting and packaging samples (e.g. saliva, blood). The kits used to collect DNA samples are fairly simple.	GenA1	Consumables
GenB	Sequencing	Decoding the order of the nucleotides in a genome. DNA sequencing on a large scale is done by high-tech machines	GenB1	Consumables
			GenB2	Instruments
			GenB3	Services
GenC	Analysis	The process to identify disease-causing variants, often run by bioinformatics software.	GenC1	Data cleansing
			GenC2	Variant Analysis
			GenC3	Database services
GenD	Interpretation	Taking analysed information and providing clinically useful interpretations and results	GenD1	Reporting
			GenD2	Link with EHRs
			GenD3	Tailoring results
GenE	Application	The process of directly using genomic information to improve targeting of clinical services	GenE1	Drug development
			GenE2	Clinical Services
			GenE3	Diagnostics
GenX	Activities not elsewhere classified	A segment where companies that are not clearly assigned to GenA-E should be placed. When this group becomes large it will be examined to see if new segments are required	N/A	N/A

Annex 5

Supplemental Data

A5.1 SMEs with fewer than 250 employees make up 98% of medtech companies (including the service and supply chain) and 82% have less than £5m turnover. SMEs with fewer than 250 employees make up 78% of biopharmaceutical companies (including the service and supply chain) and 94% have less than £5m turnover.

Company Size by Employment and Turnover

Table 3. *Percentage of Core Med Tech companies by Number of Employees*

Employee size band	Number of companies
0-4	42%
5-9	15%
10-19	13%
20-49	15%
50-99	7%
100-249	5%
250+	2%

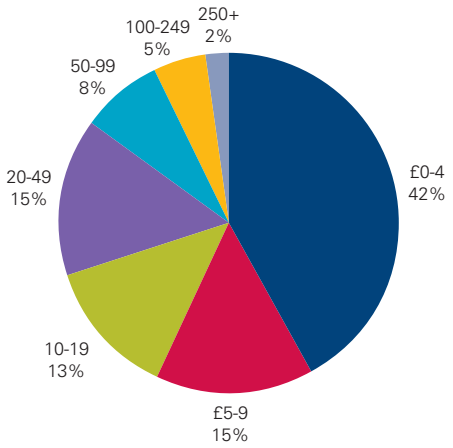


Table 4. *Percentage of Core Med Tech companies by Turnover range*

Turnover size band value	Number of Companies
£0-49,000	15%
£50-99,000	7%
£0.1-0.249m	15%
£0.25-0.499m	14%
£0.5-0.999m	11%
£1-4.9m	20%
£5m+	19%

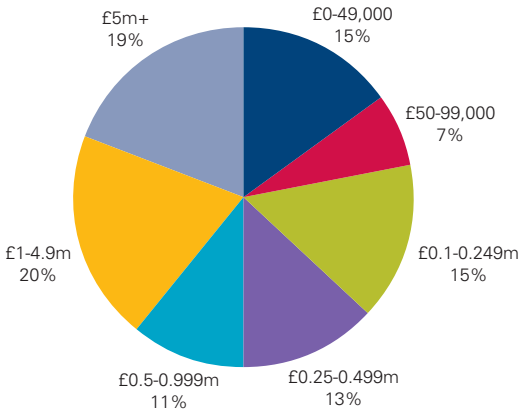


Table 5. *Percentage of Med Tech service & supply companies by Number of Employees*

Employee size band	Number of companies
0-4	42%
5-9	15%
10-19	13%
20-49	15%
50-99	7%
100-249	5%
250+	2%

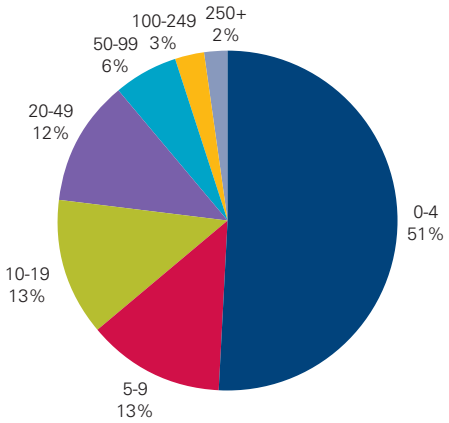


Table 6. *Percentage of Med Tech service & supply companies by Turnover range*

Turnover size band value	Number of Companies
£0-49,000	15%
£50-99,000	9%
£0.1-0.249m	20%
£0.25-0.499m	14%
£0.5-0.999m	9%
£1-4.9m	18%
£5m+	15%

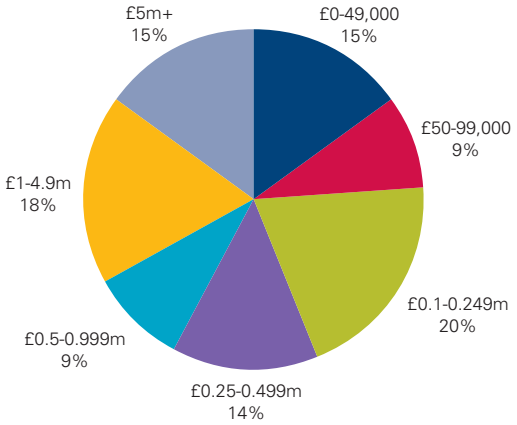


Table 7. *Percentage of Core Biopharma companies by Employment range*

Employee size band	Number of companies
0-4	43%
5-9	14%
10-19	9%
20-49	10%
50-99	6%
100-249	8%
250+	10%

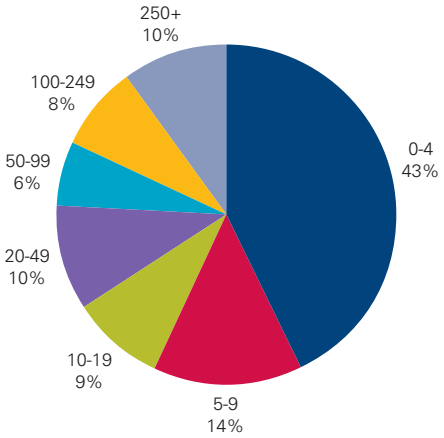


Table 8. *Percentage of Core Biopharma companies by Turnover range*

Turnover size band value	Number of Companies
£0-49,000	15%
£50-99,000	9%
£0.1-0.249m	13%
£0.25-0.499m	15%
£0.5-0.999m	9%
£1-4.9m	12%
£5m+	30%

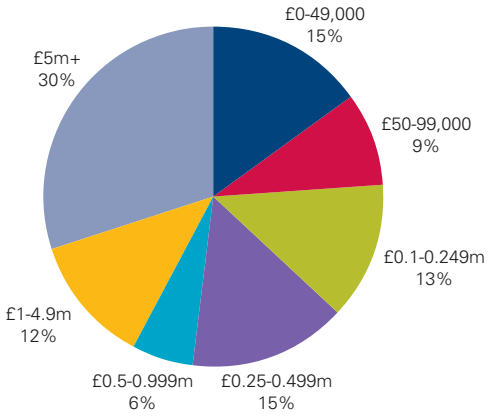


Table 9. *Percentage of Biopharma service & supply companies by Number of Employees*

Employee size band	Number of companies
0-4	55%
5-9	12%
10-19	9%
20-49	10%
50-99	6%
100-249	4%
250+	4%

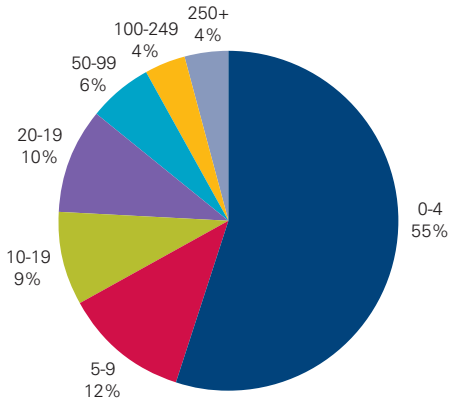
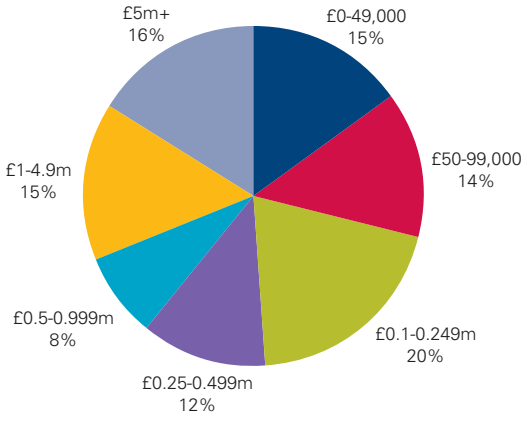


Table 10. *Percentage of Biopharma service & supply companies by Turnover range*

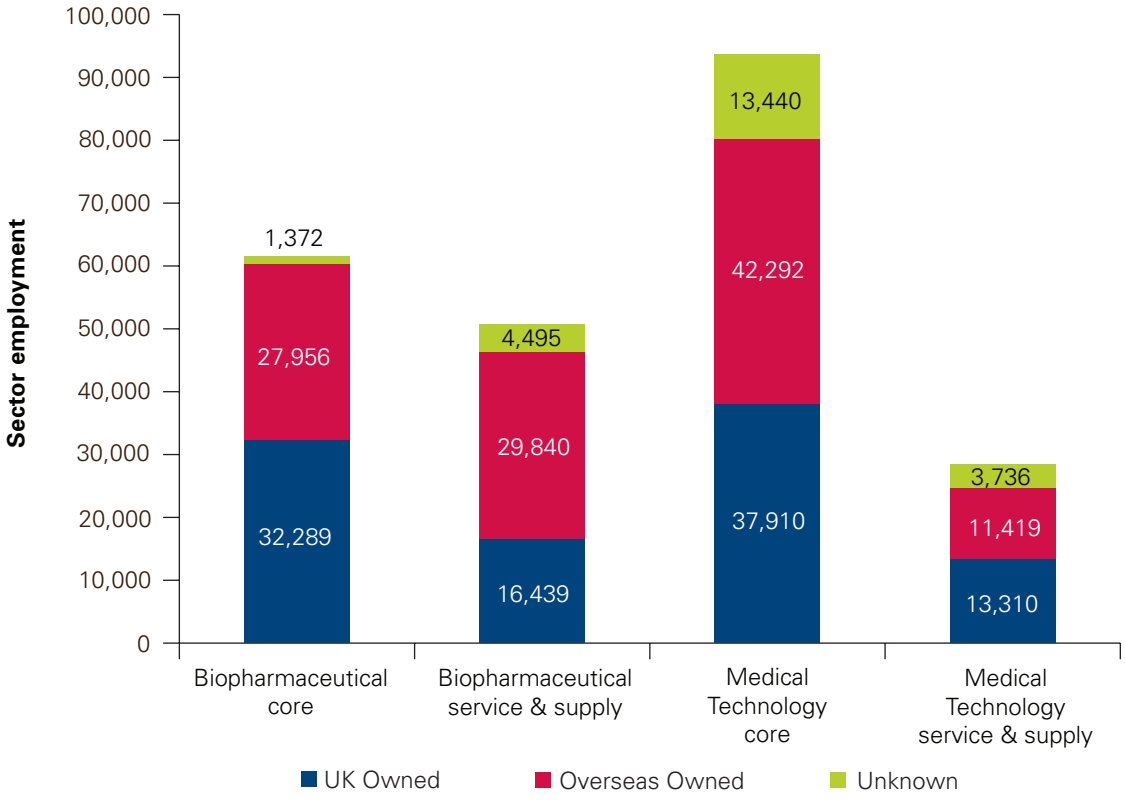
Turnover size band value	Number of Companies
£0-49,000	15%
£50-99,000	14%
£0.1-0.249m	20%
£0.25-0.499m	12%
£0.5-0.999m	8%
£1-4.9m	15%
£5m+	16%



Company Ownership

A5.2 The data sources contain information in the ultimate global owner of the companies in the database. This information is available for 2,915 of the records in the database or 48%. However, the companies where the owner origin is not known have a low economic impact as can be seen from Figure 23 that shows the distribution of employment for the life science sectors between companies that are UK or overseas owned. Companies that are UK owned employ 42% of the life science industry workforce, while companies where the owner is unknown account for 9.9%. The 213 Core Biopharma companies that are UK owned employ 29% of the total for the sector, contrasting with the 812 UK owned Core Med Tech companies that account for 32% of the sector employment.

Figure 23 *Distribution of sector employment between UK and Overseas companies*



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