Understanding the UK STEM technician workforce

For the Gatsby Charitable Foundation

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For the Gatsby Charitable Foundation

Prepared by TBR's Skills and Labour Market Team

Enquiries about this report can be addressed to:

Fiona Tuck, Head of Research

Andrew License, Senior Research Analyst

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Floor D, Milburn House,
Dean Street,
Newcastle upon Tyne, NE1 1LE

Telephone: +44 (0) 191 279 0900
Fax: +44 (0) 191 221 2220
Email: fiona.tuck@tbr.co.uk
www.tbr.co.uk

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Preface

The Gatsby Charitable Foundation has undertaken a number of previous studies in order to deliver a greater understanding of the UK's technician workforce. Key has been the 2012 publication by Geoff Mason *Science, Engineering and Technology Technicians in the UK Economy*, which was crucial in exploring cross-sectoral technician employment, education & training.

In 2014 this work has been taken forward and augmented in order to cover the whole spectrum of Science, Technology, Engineering & Mathematics (STEM) workers, covering all four STEM disciplines (plus health where there is significant scientific activity) and workers at managerial level, in addition to technicians and professionals. Additional research has also been undertaken to include occupations in the Creative Industries and Agriculture & Horticulture that are considered to be STEM, key areas of the STEM workforce that have previously been overlooked.

This report is therefore the first consistent analysis of STEM Technicians across all sectors of the economy, compared with all other STEM workers. Two supplementary reports accompany this document: *The STEM workforce in Agriculture & Horticulture* and *The STEM workforce in the Creative Industries*. In addition a technical document explaining the methodological approach across the research programme is provided.

Definitions & Glossary

The executive summary and main report makes use of a number of key definitions and descriptions that the reader should be aware of:

1. **STEM worker** – anyone working in a STEM role.

2. **STEM Role** – This can be one of the following:
    a. Manager
    b. Professional
    c. Technician, which can be broken down further:
        i. Associate Professional
        ii. Skilled Worker

3. **STEM(H) Discipline** – This can be one of the following:
    a. **Science** based role – e.g. Chemical, Biological or Physical Scientist, R&D Managers
    b. **Technology** based role – e.g. IT Specialist Manager, Web Designer / Developer, User Support
    c. **Engineering** based role – e.g. Civil, Mechanical, Electrical Engineers, Telecoms Engineers
    d. **Finance**[1] **(Mathematics)** based role – e.g. Accountant, Actuaries, Economists, Statisticians, Taxation
    e. **Health** based role – e.g. Psychologists, Nurses, Midwives, Pharmacists

4. **Highest level of qualification** – This is tied to the national qualifications framework (NQF)[2]
    a. **NQF Level 1** – e.g. GCSEs grades D-G, Foundation Diploma, Level 1 qualifications
    b. **NQF Level 2** – e.g. GCSEs grades A*-C, Higher or First Diploma, Level 2 qualifications
    c. **NQF Level 3** – e.g. A/AS-Levels, Advanced or National Diploma, Level 3 qualifications
    d. **NQF Level 4** – e.g. HNC, Certificate of Higher Education, Level 4 qualifications
    e. **NQF Level 5** – e.g. Foundation Degree, HND, Level 5 qualifications
    f. **NQF Level 6** – e.g. First Degree, Graduate Diploma, Level 6 qualifications
    g. **NQF Level 7&8** – e.g. PhD, Doctorates, Master's Degree, PGCE, Level 7 or 8 qualifications

5. **Sector** – These sectoral definitions were developed in conjunction with Gatsby using Standard Industrial Classification (SIC) codes. A full list is provided in the Appendix (Section 6.2, Page 59).

- Advanced Manufacturing
- Aerospace & Space
- Agriculture/Horticulture
- Chemicals
- Construction & Installation
- Creative
- Energy & Environmental
- Finance
- Food & Drink
- Health
- ICT
- Logistics
- Manufacturing
- Metals
- Military
- Mining & Quarrying
- Pharmaceuticals
- Public Sector
- Research & Development
- Secondary Schools
- Tertiary Education incl. FE
- Textiles
- Transport

[1] The occupations identified under this discipline are mainly based in financial roles, so throughout the paper the discipline is listed as 'Finance' as it was felt that this was a more appropriate label.
[2] http://ofqual.gov.uk/qualifications-and-assessments/qualification-frameworks/#

Glossary

STEM	Science, Technology, Engineering, Maths
SME	Small or Medium Sized Enterprise
STEM(H)	Science, Technology, Engineering, Maths and Health
NQF	National Qualification Framework
SIC	Standard Industrial Classification
SOC	Standard Occupational Classification
SET	Science, Engineering, Technology

Executive Summary

Introduction

The Gatsby Charitable Foundation has undertaken a number of previous studies in order to deliver a greater understanding of the UK's technician workforce. In particular, a 2012 publication by Geoff Mason[3] was crucial in exploring technician employment and developing a definition of Science, Technology & Engineering (SET) technicians and professionals. This study seeks to build on Mason's report, expanding the SET definition to include activities from the whole spectrum of Science, Technology, Engineering *and* Mathematics (STEM), in addition to Health (H) and also including workers at a managerial level (in addition to technicians and professionals).

The purpose of this report is to provide an understanding of where and how STEM Technicians are employed across the UK and how their patterns of employment and demographic characteristics differ from STEM Managers and Professionals. The report can be used by policy makers, STEM stakeholders and professional bodies seeking to support the development of the Technician workforce.

Workforce overview

The UK STEM workforce consists of over 4.9 million people, equivalent to 16.9% of the UK workforce (29.1 million people). Of these 4.9 million STEM workers, **2.1 million are employed in STEM Technician roles**, the equivalent of 7.3% of the total UK workforce. This can be broken down further in to:

- 1.4 million are employed in Skilled Worker roles (for example telecommunications engineers, IT engineers, smith & forge workers, electricians and electrical fitters)
- 748,000 are employed in Associate Professional roles (for example laboratory technicians, engineering technicians, draughtspersons, pharmaceutical technicians, taxation experts)

The number of Technicians in this report is higher than that identified in the Mason Report by approximately 525,000 workers.

The primary reason for this is the expansion of the original SET definition to capture additional activities in Finance (Mathematics) and Health, to build a comprehensive view of all STEM(H) activities. In addition to these key sets of occupations, desk research was carried out to a) identify additional STEM occupations in industries in which Gatsby has a specific interest (Creative Industries and Agriculture & Horticulture) and b) include occupations that have been identified in other STEM definitions following the publication of Mason's report.

A full list of the steps taken to create the definition of STEM(H) roles in this study is provided in the methodology section (Section 1.2, Page 9).

The revisions to the definition also increase the number of STEM Professionals and allow the scale of the STEM Manager workforce to be measured. A full comparison between the original SET definition in Mason's report and the revised STEM(H) definition used for this report can be viewed in Section 2, Page 11.

Overall, **STEM workers are predominantly employed in Engineering or Technology related roles**, with 43.9% and 25.7% of the total STEM workforce being based in these respective disciplines. In every discipline, workers are more likely to be employed in a STEM Professional role than a STEM Technician role. The one exception is Engineering, where a much high number of Technicians are employed than Professionals. This is driven by a prevalence of Skilled Workers within the Engineering discipline.

[3] Mason G (2012) Science, Engineering and Technology Technicians in the UK Economy

By comparison Technicians working in Science or Technology based roles are more frequently employed as Associate Professionals than Skilled Workers. Meanwhile Managers make up a small proportion of workers across all STEM disciplines.

The STEM workforce as a whole is concentrated in a number of key sectors, with over 50% of the entire workforce being based in five key industries, namely Health (with 712,000 employees), Construction & Installation (688,900 employees), Creative Industries (656,500 employees), Manufacturing (425,700 employees) and the Public Sector (181,300 employees). These industries are also important for Technicians, however there are proportionally fewer technicians in the Public Sector and more in Energy & Environmental activities.

When investigating Technicians further, there are four important industries for both Associate Professional and Skilled Worker Technicians: Construction & Installation, Creative Industries, Health and Manufacturing. The most notable difference between the two Technician types is that Associate Professionals are more likely to be employed in the Public Sector, whereas Skilled Workers are more prevalent within Advanced Manufacturing.

Who are STEM Technicians?

The gender balance across the STEM workforce is approximately **75%:25% (male to female)**, which compares fairly poorly with the national average of 54%:46% (male to female). The gender balance varies by STEM roles, but Technicians have a slightly higher than average male dominance with 79% of the workforce being male.

This balance appears to be driven by a subset of Skilled Workers where the gender imbalance is much higher at 84%:16% (male to female). By comparison Associate Professional roles are the most 'female friendly' in the STEM workforce, with a gender balance of 71%:29% (male to female).

In terms of variation by industry, there is an over-representation of male Technicians and an under-representation of female Technicians in Logistics, Mining & Quarrying, Construction & Installation and Energy & Environment. The industries where female Technicians are more prevalent include Creative Industries, Transport and Agriculture & Horticulture.

The STEM and Non-STEM workforces have very similar proportion of workers under the age of 35 (34%) and over the age of 35 (66%) years old. The key difference between the workforces is that **there is a much smaller proportion of the STEM workforce under the age of 25 years old.** This is driven by the STEM workforce being better qualified with a higher proportion of graduates than that of the Non-STEM workforce.

Those under the age of 25 years old are less prevalent in Managerial or Professional roles, which is to be expected as these roles are usually gained through experience. The Technician workforce is relatively youthful, with approximately 40% of workers aged less than 35 years old. However, it is worth noting that a relatively high proportion of the Technician workforce (when compared to Managers and Professionals) are over the age of 55 years old, suggesting the issue of an aging workforce. This is particularly a problem within the Skilled Worker workforce.

The industries most likely to feel the burden of an aging workforce are Manufacturing and Construction & Installation, where over 60,000 people in each sector are aged 55 or over. This is the equivalent of 21% and 16% of each industry's workforce (respectively). The industries least likely to be affected are Finance and the Creative industries, where approximately 10% of each industry's workforce is 55 years old or over.

As reflected in other research, **the qualification levels of STEM workers are generally higher than average** with approximately 61.8% of the STEM workforce holding a level 4+ qualification (compared to 40.4% in the Non-STEM workforce). Technicians are most likely to be qualified to Level 3, with nearly 31% of the Technician workforce holding this level of qualification. However, nearly a quarter of Technicians, hold either a Level 1 or Level 2 qualification, indicating there is a large potential base of people who may benefit by recognition through a Technician register.

This overall trend appears to be driven by the Skilled Worker workforce, with 30% of this workforce holding a Level 1 or 2 qualification and 39% holding a Level 3 qualification. By comparison, the qualification profile of Technicians in Associate Professional roles is more akin to that of STEM Managers, with the majority holding a Level 6 qualification.

The Construction & Installation and Manufacturing industries employ the greatest number of Technicians whose highest level qualification is below level 3. Each sector employs over 105,000 Technicians that hold either a Level 1 or Level 2 qualification, the equivalent of 30% of each industry. The Finance sector is least likely to employ Technicians who are not qualified to Level 3, with only 8.3% of the industry's workforce holding a Level 1 or Level 2 qualification.

Who employs STEM Technicians?

The STEM workforce as a whole tends to be employed either in small businesses (fewer than 49 employees) or large businesses (more than 250 employees), with approximately 30% of the workforce being employed in organisations of this size. When investigating more detailed size bands, it suggests that as a Technician you are just as likely to be employed in a micro businesses (less than 10 employees) as you are in a very large business (500 or more employees).

Generally Technicians are most frequently employed within SMEs, with over 55% of the workforce based in businesses employing fewer than 250 employees. This differs between the two Technician types, with Skilled Workers tending to be based in smaller businesses with fewer than 50 employees and Associate Professionals in businesses with more than 250 employees.

STEM workers are more likely to be based in London and the South East than Non-STEM workers. The East of England and Scotland also have relatively high numbers of STEM workers. The South East in particular has a high concentration of STEM workers, with 1,817 in every 10,000 workers being employed in a STEM role. By comparison, the East Midlands, Wales and Northern Ireland are less likely to employ STEM workers than Non-STEM workers.

Whilst the overall level of STEM workers varies by region, the proportion of the STEM workforce that are Associate Professionals remains consistent, accounting for approximately 16% of each region's STEM workforce. Given that the top employing industry for Associate Professionals is Health; this consistency could be because the Health sector is well embedded across the UK.

In terms of absolute numbers, the majority of Technicians are based in the South (particularly London and its surrounding counties) and around Lancashire, Leeds, Staffordshire, Hampshire and Norfolk. However, when combining the Associate Professional workforce with the Skilled Worker workforce it is clear that the North East of England employs a much higher proportion of Technicians than any other region, accounting for over 50% of the region's STEM workforce. The West Midlands employs a slightly higher proportion of Skilled Workers than that of the North East but fewer Associate Professionals, meaning the overall proportion of the STEM workforce that are Technicians is slightly lower.

Interestingly the regions identified as having the highest density of STEM workers (Scotland, London, the South East, South West and the East of England) generally have a smaller proportion of Technicians within their STEM workforce, indicating that there area higher number of Professionals driving the high density of STEM workers.

All STEM roles command a higher weekly average salary than those employed in non-STEM roles, with STEM workers earning £675 per week on average compared to £420 for non-STEM workers. This high average salary for STEM is driven by Managers and Professionals being paid well above average (£938 per week and £778 per week on average respectively). Technicians are generally paid £106 per week more than the non-STEM average (£420 per week); with Associate Professionals commanding a higher average weekly wage than those in a Skilled Worker role (£550 compared to £503).

Jobs in the Finance and Technology disciplines command a particularly high premium from employers across the STEM workforce as a whole (£792 and £745 on average per week respectively) and in the Technician workforce (£596 and £531 on average per week respectively). In fact, Finance based Technicians are the best paid across the Technician workforce.

In general, there is parity in the wages commanded by Technicians across STEM disciplines; with the clear exception of Health based Technicians who are paid approximately £200 per week less than other disciplines. Technicians are *usually* paid less than STEM Managers and Professionals. However, there are naturally some exceptions to this. For example Engineering Technicians (SOC 3113) earn £653 per week on average, compared to an average salary of £515 per week for Web Design & Development Professionals (SOC 2137).

In a number of cases there appear to be wage premia in effect for 'niche' occupations, which make up small proportions of the workforce but command particularly high wages. For example, only 4.2% of those working in Science disciplines are employed in a Skilled Worker role. These individuals command a weekly salary of £602, almost the same weekly salary as Professionals (£680 per week) and considerably more than Associate Professionals (£444 per week on average).

1. Introduction

The Gatsby Charitable Foundation has undertaken a number of previous studies in order to deliver a greater understanding of the UK's technician workforce:

- Science, Engineering and Technology Technicians in the UK Economy – Geoff Mason – 2012
- Flying High? (Technicians in Aerospace) – Paul Lewis – 2013
- Technician and intermediate roles in the healthcare sector – Alison Fuller et al. – 2013
- Space for Technicians? (Technicians in UK space industry) – Paul Lewis – 2013

The 2012 publication by Geoff Mason was crucial in exploring cross sectoral technician employment, education & training and as part of this work an agreed definition of Science, Engineering & Technology (SET) technicians and professionals was established[4]. However, the definition excluded Health as this was captured in other research. The definition used by Geoff Mason followed the Technician Council in considering a technician to be someone using science, engineering or technology knowledge and skills at level 3 and above as part of their role. Therefore finance roles which are normally based on the use of mathematical skills and knowledge were also excluded from his analysis.

This study has taken the Mason report forward and augmented the definition in order to cover the whole spectrum of Science, Technology, Engineering & Mathematics (STEM) workers, covering all four STEM disciplines (plus health where there is significant scientific activity) and workers at a managerial level, in addition to technicians and professionals. Additional research has also been undertaken to include occupations in the Creative Industries and Agriculture & Horticulture that are considered to be STEM, key areas of the STEM workforce that have previously been overlooked. As such, this is the first consistent analysis of STEM Technicians across all sectors of the economy, compared with all other STEM workers.

The purpose of the analysis is to provide a resource that will support an understanding of where and how STEM Technicians are employed across the UK, which can be used by policy makers, STEM stakeholders and professional bodies seeking to support the development of the Technician workforce.

The research sits within a wider programme of work by Gatsby to drive improvements in the supply and utilization of intermediate STEM skills.

1.1 Aims and objectives

The aim of this paper is to provide an insight in to how STEM Technicians are employed in the UK economy and how their demographics differ from STEM Managers and Professionals.

To this end, the research has the following objectives:

1. Understand the scale of the STEM workforce, in terms of these three employment roles (Managers, Professionals, Technicians).
2. Provide details on key demographics, to understand the makeup of the STEM Technician workforce and how this differs from other Managers and Professionals.
3. Provide details on the spread of Technicians amongst businesses of different size and sectoral activity, as well as their distribution geographically across the UK.
4. Investigate the average wage received by Technicians and compare this against other roles.

[4] This built on research Gatsby commissioned from IES in 2010 to understand SET based technicians in the UK and European Labour Force Surveys.

1.2 Method

This research uses data from the Office for National Statistics' (ONS) Annual Population Survey[5] (APS) in an 'industry/occupation matrix' which identifies for each STEM occupation, the sector in which that STEM role is most likely to work. This is an innovative approach, enabling an understanding of the true size and scope of the STEM workforce across the economy, rather than limiting the research to considering STEM roles working in a narrow band of STEM sectors.

As noted above, this research seeks to build on prior research, specifically the 2012 publication by Geoff Mason[6], which covered the SET element of STEM, but excluded financial and health occupations. TBR worked closely with the team at Gatsby to investigate additional occupations that should be incorporated in to the definition of STEM workers. This involved a number of activities:

1. Conversion of the SET definition from the SOC 2000 system to SOC 2010 system.
2. Desk research[7] in to specific industries of interest (Creative Industries and Agriculture & Horticulture) to identify relevant roles that were previously excluded.
3. Identification of management occupations that contain STEM workers, used to form an additional 'STEM Managers' group.
4. Addition of finance and health based roles previously excluded from the SET Technician research.
5. A review of existing SOC based STEM definitions.

All occupations in this research are assigned under the Standard Occupational Classification (SOC 2010) system[8] and the definitions are provided in the appendix, Section 6.1 (page 56).

A separate document describing in detail the method followed across the project is appended to this report.

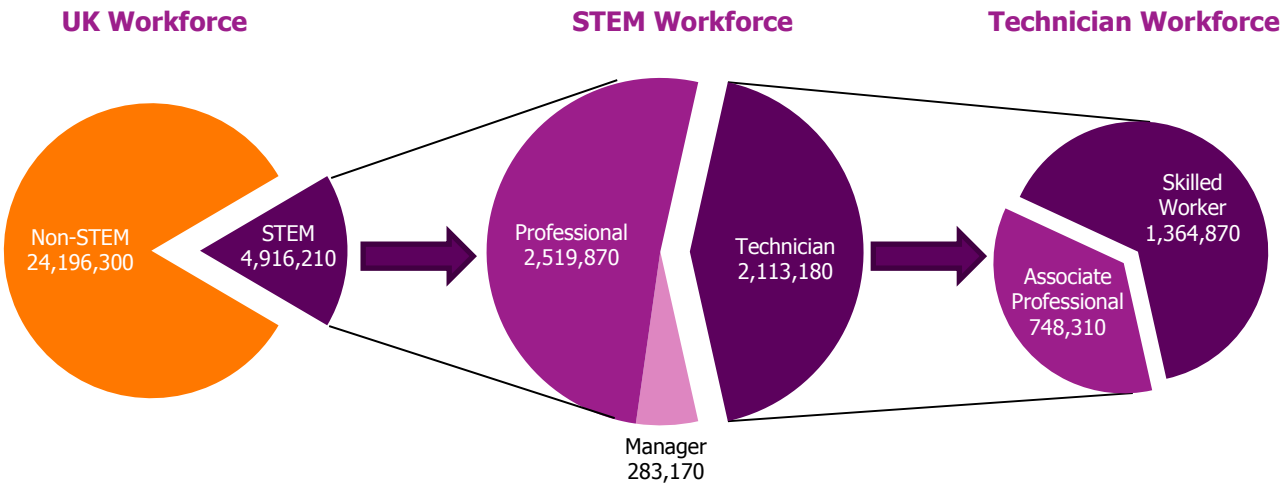
[5] The APS data used for this project was the July 2012 to June 2013 annual dataset.
[6] http://www.gatsby.org.uk/en/Education/Projects/Technician-Numbers.aspx
[7] This included consultation with Sector Skills Councils representing these industries, namely Creative & Cultural Skills, Creative Skillset and Lantra.
[8] http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/index.html

2. The STEM workforce

The STEM workforce consists of over 4.9 million people in the UK, the equivalent of 16.9% of the total UK workforce (29.1 million people). Just over half of the STEM workforce is employed in Professional roles (over 2.5 million) and just over 283,000 people are employed in Manager roles.

The remaining 2.1 million people in the STEM workforce are employed in STEM Technician roles[9]. Of these 2.1 million Technicians nearly 1.4 million are based in 'Skilled Worker' roles.

Figure 1: The STEM Workforce breakdown



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S0)

As noted in the introduction, this research builds on prior work into the SET Technician workforce[10], in order to provide a fuller picture of STEM and health (or STEM(H)) activities.

[9] It should be noted that these figures are based purely on occupational classification so there may be some people employed in technician based roles that do not hold a Level 3 qualification (the suggested qualification level for a registered technician) but that are operating at the equivalent of a Level 3 qualification.

[10] http://www.gatsby.org.uk/en/Education/Projects/Technician-Numbers.aspx

The impact of adding to the original SET definition is shown in Table 1 below. The key finding is that an additional 1.8 million STEM workers are included, and in particular an additional half million Technicians.

Table 1: Additional STEM workers as a result of revised definition

STEM Group	Workers		
	Mason report SET definition	This report STEM(H) definition	Total added in this research
Manager	0	283,170	283,170
Professional	1,511,050	2,519,870	1,008,820
Technician	1,587,510	2,113,170	525,660
Associate Professional	*590,400*	*748,310*	*157,910*
Skilled Worker	*997,110*	*1,364,870*	*367,760*
STEM Workers	3,098,550	4,916,210	1,817,660
Non-STEM Workers	26,013,960	24,196,300	-1,817,660
Total Workers	**29,112,510**	**29,112,510**	**0**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W1/Headlines)

Please note that the remainder of this report uses the full STEM(H) definition.

2.1 STEM disciplines

When breaking down the STEM workforce by discipline, it is clear that STEM workers predominantly work in Engineering based roles, with nearly 2.2 million (out of 4.9 million) working in this discipline. This is followed by Technology based roles, with over 1.2 million people employed in this discipline.

A notable difference between these two disciplines is that there are a significantly higher proportion (and quantum) of Engineering based Technicians than Technology based Technicians. Conversely, Professionals are much more likely to be working in Technology based roles. Given the size of Engineering it is interesting to see that there are similar numbers of Professionals to that of Health.

Table 2: STEM workforce by type of role and STEM discipline

STEM Group	Science	Technology	Engineering	Finance	Health	Total
Manager	0[11]	59,200	179,490	37,610	6,860	283,170
Professional	259,570	827,200	694,290	96,480	642,330	2,519,870
Technician	129,520	379,420	1,284,570	105,370	214,300	2,113,170
Associate Professional	*113,160*	*196,100*	*281,140*	*63,230*	*94,670*	*748,310*
Skilled Worker	*16,360*	*183,320*	*1,003,430*	*42,130*	*119,630*	*1,364,870*
Grand Total	**389,090**	**1,265,820**	**2,158,350**	**239,460**	**863,500**	**4,916,210**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S0)

By comparison, the number of people employed in a Science or Finance discipline is much lower with 389,090 employees and 239,460 employees respectively. The Health discipline sits in the middle, with just over 863,000 people employed in this discipline, the majority of whom are in Professional roles.

It should be noted that the lack of Managers employed in a Science based discipline is due to a definitional issue within the Standard Occupational Classification (SOC) system in that there are no SOC codes that appropriately capture managers in science based activities. As such the results here depict that there are none, when in reality there will be many. In the SOC system they will be captured within another SOC which is not inherently Science based.

[11] This is a definitional issue within the Standard Occupation Classification (SOC) system in that there are no SOC codes that appropriately capture managers in a science based discipline. As such the results here depict that there are none, although there will of course be many. They will be captured within another SOC code which is not inherently Science based.

Table 3 (below) shows the distribution of STEM roles within STEM disciplines, to highlight the most likely occupation for an individual (i.e. Manager, Professional or Technician) in each. It is clear that across the STEM workforce, Managers make up a relatively small proportion of each discipline. The one exception is Finance with nearly 16% of those employed in this discipline being based in a Manager role. When investigating this finding further, it is driven mainly by managers employed in a Finance discipline.

In Science and Technology, it is much more likely for individuals to be employed in a STEM professional role rather than a STEM Technician role. However, the opposite is the case in Engineering and in Finance, where the proportion of Professionals and Technicians is broadly similar.

Table 3: Distribution of STEM roles within STEM disciplines

STEM Role	Science	Technology	Engineering	Finance	Health	Total
Manager	0.0%*	4.7%	8.3%	15.7%	0.8%	1.0%
Professional	66.7%	65.3%	32.2%	40.3%	74.4%	8.7%
Technician	33.3%	30.0%	59.5%	44.0%	24.8%	7.3%
Associate Professional	*29.1%*	*15.5%*	*13.0%*	*26.4%*	*11.0%*	*2.6%*
Skilled Worker	*4.2%*	*14.5%*	*46.5%*	*17.6%*	*13.9%*	*4.7%*
STEM Roles	100.0%	100.0%	100.0%	100.0%	100.0%	16.9%
Non-STEM Roles	0.0%	0.0%	0.0%	0.0%	0.0%	83.1%
Grand Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S0)
* - This is a definitional issue within the Standard Occupational Classification system, please see footnote 11.

An alternative way of viewing this information is by understanding the distribution of STEM roles across STEM disciplines, which is provided in Table 4 below. From this table, the impact of Science and Finance being much smaller activities than that of Engineering is clearly seen, with over 60% of STEM Managers and 60% of STEM Technicians being based in an Engineering discipline. This is particularly interesting as only 8% of those employed in Engineering are employed in Management roles, but this 8% accounts for 63% of all Management roles.

One of the key differences from the Engineering discipline is that Technicians working in Science or Finance are much more likely to be working in Associate Professional roles than Skilled Worker roles. Skilled Workers are extremely prevalent in the Engineering discipline accounting for over 70% of all Skilled Workers. Whilst Associate Professionals are also prevalent within the Engineering discipline, there is also a strong prevalence (to a lesser extent) in the Technology discipline, which leads to a much more even distribution across all disciplines.

The distribution of Professionals amongst disciplines is similar to that of Associate Professionals, with more of an emphasis on Technology and Health, and less of a reliance on Science, Finance and Engineering.

Table 4: Distribution of STEM roles across STEM disciplines

STEM Role	Science	Technology	Engineering	Finance	Health	% Total
Manager	0.0%*	20.9%	63.4%	13.3%	2.4%	100%
Professional	10.3%	32.8%	27.6%	3.8%	25.5%	100%
Technician	6.1%	18.0%	60.8%	5.0%	10.1%	100%
Associate Professional	*15.1%*	*26.2%*	*37.6%*	*8.5%*	*12.7%*	100%
Skilled Worker	*1.2%*	*13.4%*	*73.5%*	*3.1%*	*8.8%*	100%
Total	**7.9%**	**25.7%**	**43.9%**	**4.9%**	**17.6%**	**100%**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S0)
* - This is a definitional issue within the Standard Occupational Classification system, please see footnote 11.

2.2 Sector of activity

The STEM workforce as a whole is relatively concentrated within a few key industries, with the top five industries employing STEM workers consisting of:

1. Health with 712,000 employees (14.5% of the STEM workforce)
2. Construction & Installation with 688,900 employees (14.0%)
3. Creative Industries with 656,500 employees (13.4%)
4. Manufacturing with 425,700 employees (8.7%)
5. The Public Sector with 181,300 employees (3.7%)

Four of these five key industries also feature within the Non-STEM workforce, with Health, Construction & Installation and Manufacturing holding the same positions in the Non-STEM top five. This highlights the overall economy's reliance on these key industries.

The top five industries vary slightly by STEM role, as highlighted in orange in Table 5 below, however it is clear that Construction & Installation, Creative Industries and Manufacturing are vital to Managers, Professionals and Technicians. The strong showing of the Health sector in the top five industries above is driven by a large number of both Professionals and Technicians.

Table 5: STEM Workforce split by STEM Role and Sector

Sector	Manager	Professional	Technician
Advanced Manufacturing	2,920	66,490	78,250
Aerospace & Space	740	41,430	41,030
Agriculture/Horticulture	5,350	38,400	54,800
Chemicals	290	11,430	14,930
Construction & Installation	123,380	176,220	389,280
Creative	36,230	423,130	197,110
Energy & Environmental	13,660	73,470	87,170
Finance	14,350	95,620	50,820
Food & Drink	850	17,000	29,630
Health	7,270	544,520	160,290
ICT	5,300	68,790	40,710
Logistics	1,430	12,250	13,810
Manufacturing	8,910	97,370	319,450
Metals	690	9,670	36,750
Military	520	28,760	25,470
Mining & Quarrying	1,450	1,770	3,280
Pharmaceuticals	1,110	28,460	15,100
Public Sector	6,920	114,810	59,600
Research & Development	1,830	83,670	35,080
Secondary Schools	1,190	7,890	35,530
Tertiary Education in including FE	2,260	89,900	32,280
Textiles	260	2,140	4,720
Transport	2,300	18,350	16,340
Other Industries	*43,970*	*468,350*	*371,760*
Grand Total	**283,170**	**2,519,870**	**2,113,170**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S6)

When investigating Technicians in more detail, there are four clearly important industries for both Associate Professionals and Skilled Workers: Construction & Installation, Creative Industries, Health and Manufacturing (as shown in Table 6, which highlights the top five industries for Technicians).

However, despite this reliance on similar industries, there are also some subtle differences between the two Technician types. The most notable difference is that Associate Professionals are more likely to be employed in the Public Sector; whereas Skilled Workers are more prevalent within Advanced Manufacturing activities.

Table 6: Sectors in which STEM Technicians are employed

	Associate Professional		Skilled Worker	
Sector	Number	Proportion	Number	Proportion
Advanced Manufacturing	23,450	3.1%	54,800	4.0%
Aerospace & Space	20,260	2.7%	20,770	1.5%
Agriculture/Horticulture	8,740	1.2%	46,060	3.4%
Chemicals	6,150	0.8%	8,790	0.6%
Construction & Installation	48,590	6.5%	340,690	25.0%
Creative	69,020	9.2%	128,080	9.4%
Energy & Environmental	33,610	4.5%	53,560	3.9%
Finance	43,170	5.8%	7,660	0.6%
Food & Drink	9,590	1.3%	20,040	1.5%
Health	95,630	12.8%	64,670	4.7%
ICT	18,010	2.4%	22,700	1.7%
Logistics	5,640	0.8%	8,170	0.6%
Manufacturing	51,770	6.9%	267,680	19.6%
Metals	4,290	0.6%	32,460	2.4%
Military	15,650	2.1%	9,810	0.7%
Mining & Quarrying	1,150	0.2%	2,130	0.2%
Pharmaceuticals	11,340	1.5%	3,760	0.3%
Public Sector	45,830	6.1%	13,760	1.0%
Research & Development	28,570	3.8%	6,510	0.5%
Secondary Schools	30,370	4.1%	5,160	0.4%
Tertiary Education incl. FE	24,360	3.3%	7,920	0.6%
Textiles	2,380	0.3%	2,340	0.2%
Transport	7,210	1.0%	9,140	0.7%
Other Industries	*143,540*	*19.2%*	*228,220*	*16.7%*
Grand Total	**748,310**	**100.0%**	**1,364,870**	**100.0%**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S6)

When taking proportions into account, it is clear that there are other differences that come to the forefront, such as Finance being much more important for Associate Professionals than Skilled Workers (5.8% of the Associate Professional workforce compared to 0.6% of the Skilled Workers workforce). Similarly it is evident that the Health sector and the Public sector are much more important industries for the Associate Professional workforce than the Skilled Worker workforce. In addition to this, Associate Professionals are much more likely to be employed in Education (Secondary or Tertiary), Research & Development, ICT, Aerospace & Space, Military and Pharmaceuticals than Skilled Workers.

On the other hand, it is evident that Construction & Installation and Manufacturing are much more significant industries for Skilled Workers than they are for Associate Professionals, accounting for nearly 45% of the workforce. Across both Technician types it is clear that the Creative Industries, Advanced Manufacturing and Energy & Environmental have similar strengths, with similar proportions of the workforce being based in these industries.

3. Who are STEM technicians?

This section considers the demographic profile of STEM technicians based on a number of key factors: gender, age and highest level of qualification attained. An initial overview of Technicians is provided alongside the other STEM groups and this is then investigated in more detail by looking at how the demographic changes by different industrial activity.

Please note that for the purposes of this paper, where there are large differences between Associate Professionals and Skilled Workers these sub-categories will be presented separately; where there is no large difference between the two sub-categories an overall Technicians figure will be presented.

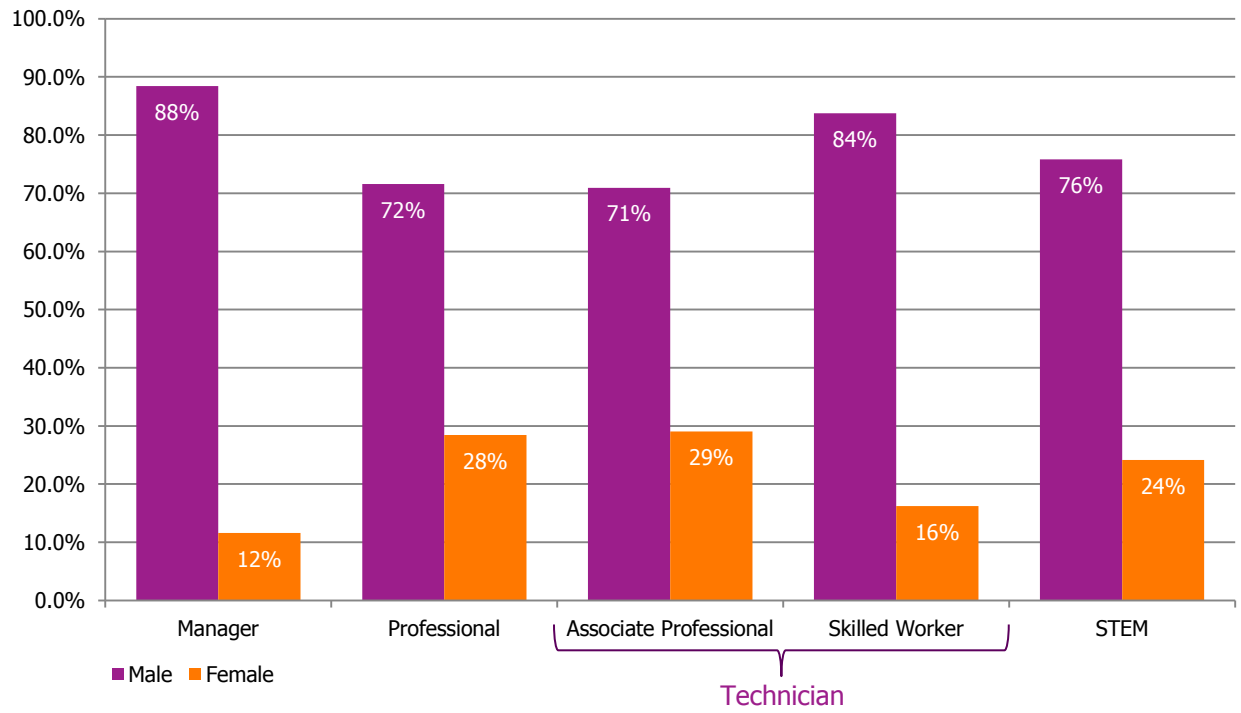
3.1 Gender

The total STEM workforce is male dominated, with a gender balance of approximately 75%:25% (male to female), which is very different to the overall national average of 54%:46% (male to female).

This balance varies quite significantly by STEM role, with male dominance peaking within STEM Manager roles, where the gender balance is approximately 88%:12% (male to female)

Technicians overall have a slightly higher than average male dominance with 79% of the Technician workforce being male. However, this appears to be driven by the subset of Skilled Workers, where the gender balance is higher than the average at 84%:16% (male to female).

Figure 2: Gender balance across STEM roles*



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S9a)
* Please note that Associate Professionals and Skilled Workers are sub-sets of the Technician role

Associate Professional and Professional roles are the most 'female friendly' roles within the STEM workforce, with a gender balance of 71%:29% and 72%:28% (male to female) respectively, which is slightly above the overall STEM average.

When investigating Technicians in more detail by industry, some very different patterns emerge. This is highlighted in Table 7 below, which shows where certain industries have a higher proportion of females than the overall Technician average of 20.8%.

Perhaps unsurprisingly, those sectors that employ a high absolute number of female technicians are more likely to employ an above average proportion of female technicians. The exception is Manufacturing and Construction & Installation, where despite relatively high numbers of female technicians, the proportion of the total workforce that is female is relatively low. More women are employed in Construction & Installation than in Research & Development, but make up only 3% of the Construction workforce, compared to 31% of the Research & Development workforce.

Despite low absolute numbers of women in sectors such as Textiles and Pharmaceuticals, these sectors do employ an above average proportion of women, compared to the overall Technician average.

The levels witnessed below are broadly similar for Associate Professionals and Skilled Workers. The only notable differences are for Associate Professionals where a lower than average proportion of females is employed in the Creative sector and a higher proportion employed in Food & Drink.

Table 7: Number and Proportion of STEM technicians that are female

Sector	Female	Total Technicians	% Female
Health	101,160	160,290	63.1%
Creative	62,020	197,110	31.5%
Agriculture/Horticulture	34,290	54,800	62.6%
Public Sector	23,840	59,600	40.0%
Secondary Schools	17,840	35,530	50.2%
Manufacturing	16,670	319,450	5.2%
Finance	14,110	50,820	27.8%
Construction & Installation	11,590	389,280	3.0%
Research & Development	10,970	35,080	31.3%
Tertiary Education incl. FE	9,660	32,280	29.9%
Energy & Environmental	6,480	87,170	7.4%
Advanced Manufacturing	6,140	78,250	7.9%
Food & Drink	4,580	29,630	15.5%
ICT	4,320	40,710	10.6%
Pharmaceuticals	4,170	15,100	27.6%
Military	3,000	25,470	11.8%
Aerospace & Space	2,520	41,030	6.1%
Chemicals	2,520	14,930	16.8%
Transport	1,970	16,340	12.0%
Textiles	1,260	4,720	26.6%
Metals	1,090	36,750	3.0%
Logistics	740	13,810	5.4%
Mining & Quarrying	340	3,280	10.4%
Other	97,740	371,760	26.3%
Total Technicians	**439,000**	**2,113,170**	**20.8%**
Total Economy	**13,522,710**	**29,112,510**	**46.4%**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S10c)

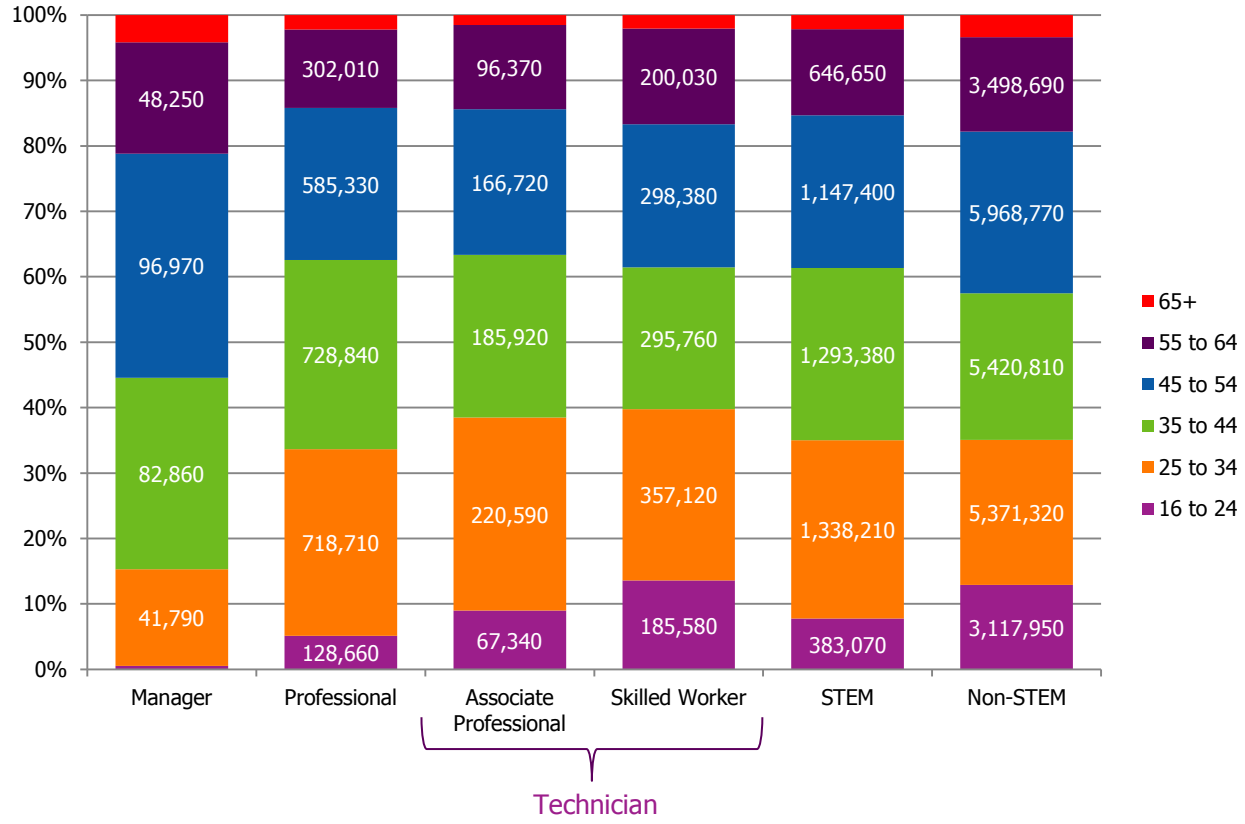
3.2 Age

The STEM and Non-STEM workforces have very similar proportions of workers under the age of 35 (approximately 34%) and aged 35 or over (approximately 66%). The key difference between the STEM and Non-STEM workers under 35 years old is that there is a much smaller proportion of the STEM workforce that are under the age of 25 years old. This is driven by the STEM workforce being much more highly qualified with a larger proportion of graduates than that of the Non-STEM workforce, this is explored in more detail in Section 3.3 (page 20).

The distribution amongst age bands varies by STEM role, with individuals under the age of 25 being less prevalent within Manager or Professional roles. This is to be expected as these roles generally require experience, which means they are less likely to be taken on by those leaving further education and more likely to be taken on by those completing degree qualifications that have gained experience in another role.

In general the Technician workforce is relatively young with approximately 40% of associate professionals and skilled workers under 35 years. The proportion of workers aged between 16 and 24 years old is broadly similar to that of the Non-STEM workforce, suggesting less of a reliance on graduates for these roles. Whilst there are a large number of young workers in Technician roles, it is also worth noting that a much larger number of Technicians are over the age of 55, suggesting the issue of an aging workforce. This is particularly the case for Skilled Workers, where a higher proportion of people than Professionals or Associate Professionals are aged over 55.

Figure 3: Distribution of STEM roles amongst age bands



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S2)

The issue of an aging workforce differs by industry, as such the following table highlights those industries where a higher than average proportion of workers are aged 55 or above. This gives an indication as to how much of an issue retirement might be in the next 10 years.

In terms of absolute numbers, the industries most likely to feel the burden of an aging Technician workforce are Manufacturing and Construction & Installation, where over 60,000 people in each sector are aged over 55 years old, the equivalent of 20.5% and 16.1% of each industry's workforce.

Although smaller in absolute terms, 27% (9,900) of the current workforce in Metals in aged over 55. This is followed closely by the Food & Drink industry (25.8% or 7,640 workers) and the Textiles industry (25.6% or 1,210 workers).

Table 8: Technicians most likely to retire in the next 10 years by sector

Sector	55+	Total Technicians	% 55+
Manufacturing	65,460	319,450	20.5%
Construction & Installation	62,860	389,280	16.1%
Creative	20,050	197,110	10.2%
Health	18,930	160,290	11.8%
Energy & Environmental	13,610	87,170	15.6%
Public Sector	10,310	59,600	17.3%
Metals	9,900	36,750	26.9%
Advanced Manufacturing	9,270	78,250	11.8%
Agriculture/Horticulture	8,270	54,800	15.1%
Tertiary Education incl. FE	7,940	32,280	24.6%
Food & Drink	7,640	29,630	25.8%
Secondary Schools	7,580	35,530	21.3%
Aerospace & Space	7,180	41,030	17.5%
ICT	5,950	40,710	14.6%
Research & Development	4,900	35,080	14.0%
Finance	4,900	50,820	9.6%
Military	2,900	25,470	11.4%
Pharmaceuticals	2,810	15,100	18.6%
Logistics	1,990	13,810	14.4%
Chemicals	1,980	14,930	13.3%
Transport	1,940	16,340	11.9%
Textiles	1,210	4,720	25.6%
Mining & Quarrying	800	3,280	24.4%
Other	57,400	371,760	15.4%
Total Technicians	**335,770**	**2,113,170**	**15.9%**
Total Economy	**5,071,620**	**29,112,510**	**17.4%**

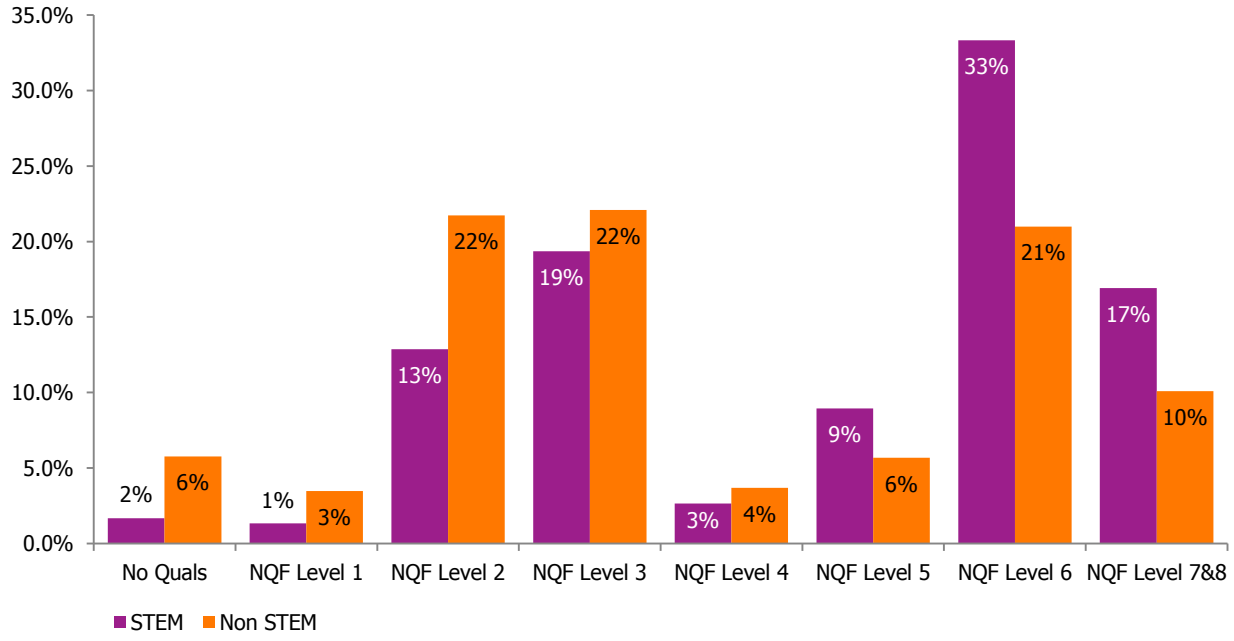
Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S9c)

The industries least likely to be affected by a retiring workforce are Finance where only 9.6% of the workforce is over 55 years old and the Creative industries where just over 10% are 55 years of age or older.

3.3 Highest level of qualification

Overall, the STEM workforce tends to be more highly qualified than the non-STEM workforce. In particular, there is a much greater proportion of the STEM workforce qualified to Level 4+ (61.8% compared to 40.4%). This is especially the case for Level 6, where one third (33.3%) of the STEM workforce is qualified to this level compared to 21% in the non-STEM workforce.

Figure 4: Comparison between STEM & non-STEM occupations by qualification level



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S4)

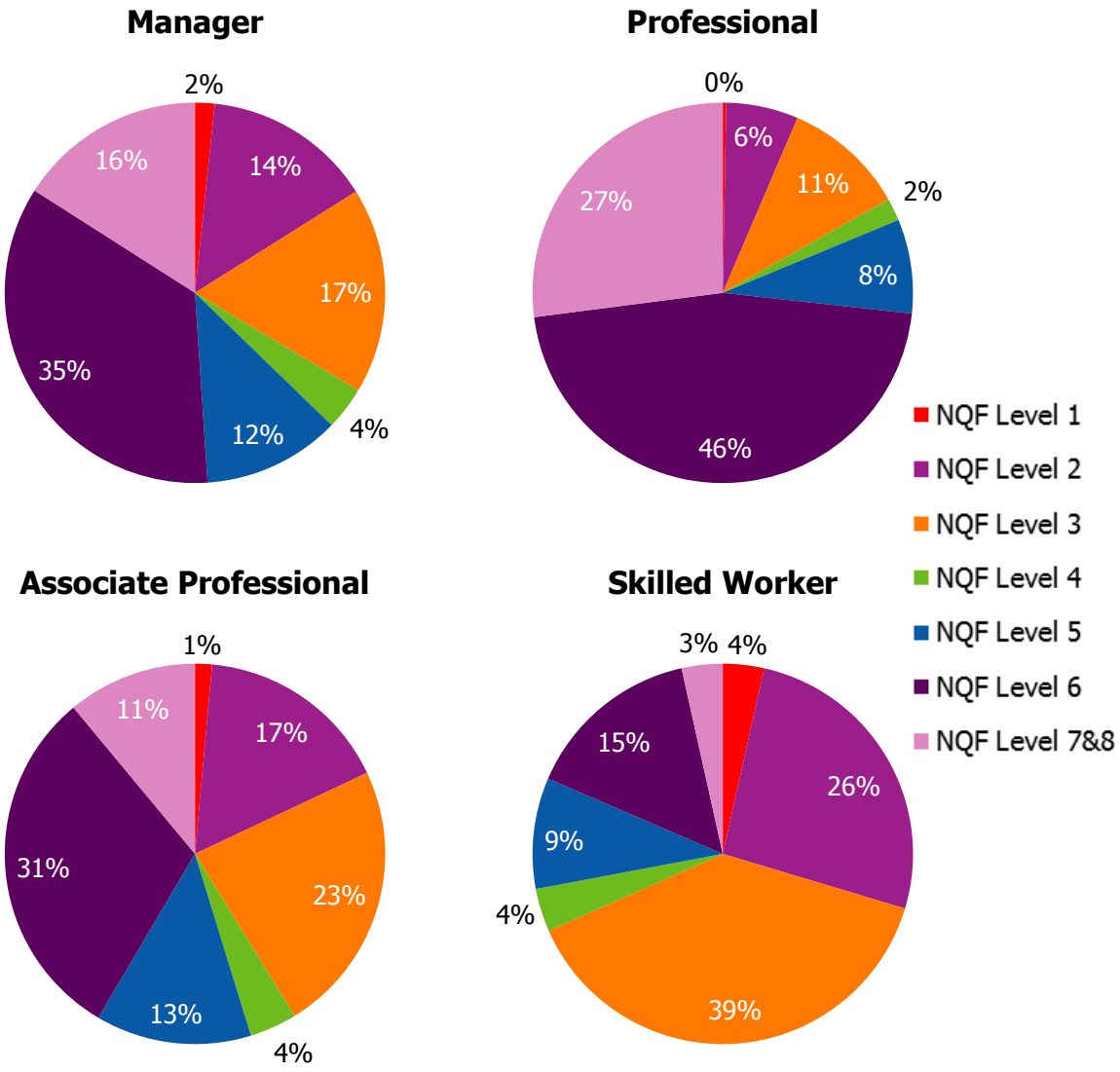
Whilst overall, the STEM workforce is highly qualified, the distribution for each STEM role (Manager, Professional and Technician) differs quite substantially, as exemplified in the charts over the page.

Managers and Professionals are more likely to be qualified to Level 6, however Professionals are much more likely to be qualified to Level 7 or 8 than Managers. As might be anticipated, Technicians are most likely to be qualified to level 3, with nearly 31% of the Technician workforce holding this level of qualification.

This result is to be expected, as the definition is based on SOC codes. The SOC classification takes some account of education and so those in SOC codes 1 and 2 are more likely to have higher qualifications than those in SOC codes 8 and 9. In trying to identify which SOC codes would include technicians the primary judgement was that the occupation would involve understanding and applying knowledge from the STEM domain, as in essence this is what technicians do. The level of qualification wasn't a consideration. This leads to a position whereby anyone working in a specific SOC is considered to be a technician (or manager or professional), based on the job description and regardless of their highest level of qualification.

This contrasts with an alternative approach to classifying technicians used by Gatsby, which is that to be a technician one *should* have a level 3 qualification. The granularity in this data makes it possible to identify the highest qualification held by people working in Technician SOCs, from NQF level 1 to 7/8 (see Figure 5 below). This is of interest in terms of technician registration, as those qualified at level 1 and 2 may be a group of technicians for whom recognition through registration would be particularly valuable.

Figure 5: Qualification distribution of STEM workers



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S4)

When investigating Technicians in more detail, it is clear that Associate Professionals and Skilled Workers are very different. Skilled Workers have a relatively similar distribution to the overall Technician distribution, with the majority having a Level 3 qualification and approximately 30% having a Level 1 or Level 2 qualification.

Associate Professionals on the other hand, tend to have a qualification profile more akin to that of Managers, with the majority having a Level 6 qualification. This may indicate an element of over-qualification within the Associate Professional group, or the low numbers of people with Level 4 or Level 5 qualifications in this role potentially suggest a gap in relevant tertiary education.

Table 9 shows the number and proportion of Technicians whose highest qualification is either a Level 1 or Level 2. This provides an understanding of potential registrants that may benefit most from recognition through a Technician register.

Construction & Installation and Manufacturing industries employ the largest quantum and proportion of Technicians whose highest qualification is up to Level 2, with over 105,000 Technicians in each sector having either a Level 1 or Level 2 qualification (over 30% in each industry). Advanced Manufacturing and Metals also have a high propensity for Technicians to not be qualified to Level 3. Those industries also have high levels of workers due to retire in the next 10 years (see Table 8, page 19).

Table 9: Number and proportion of Technicians under Level 3 by sector

Sector	Level 1 & 2	Total Technicians	% under level 3
Construction & Installation	118,580	389,280	30.5%
Manufacturing	105,980	319,450	33.2%
Health	29,490	160,290	18.4%
Creative	25,800	197,110	13.1%
Advanced Manufacturing	20,390	78,250	26.1%
Energy & Environmental	18,380	87,170	21.1%
Agriculture/Horticulture	12,310	54,800	22.5%
Public Sector	10,890	59,600	18.3%
Metals	10,740	36,750	29.2%
Aerospace & Space	10,050	41,030	24.5%
ICT	9,950	40,710	24.4%
Secondary Schools	8,240	35,530	23.2%
Food & Drink	6,580	29,630	22.2%
Military	6,380	25,470	25.0%
Tertiary Education incl. FE	5,080	32,280	15.7%
Research & Development	4,290	35,080	12.2%
Finance	4,240	50,820	8.3%
Chemicals	4,010	14,930	26.9%
Logistics	3,840	13,810	27.8%
Transport	2,330	16,340	14.3%
Pharmaceuticals	2,100	15,100	13.9%
Mining & Quarrying	950	3,280	29.0%
Textiles	650	4,720	13.8%
Other	76,280	371,760	20.5%
Total Technicians	**497,500**	**2,113,170**	**23.5%**
Total Economy	**7,337,810**	**29,112,510**	**25.2%**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S11c)

4. Who employs STEM technicians?

This section takes a more detailed look at STEM technicians from an organisational stand point, specifically investigating the size of businesses in which they are employed, the industry that they are based in, the geographic location and the typical remuneration. As before, an initial overview of Technicians is provided alongside the other STEM groups and they are then investigated in more detail.

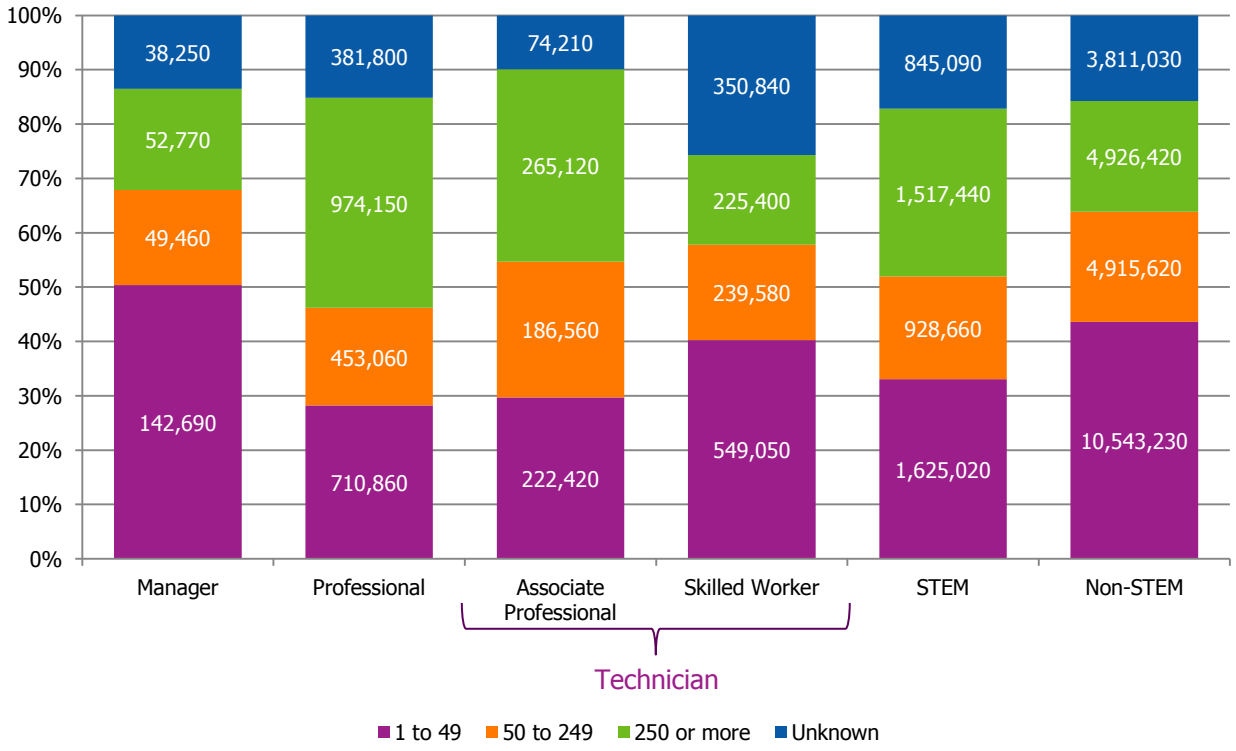
Please note that for the purposes of this paper, where there are large differences between Associate Professionals and Skilled Workers these sub-categories will be presented separately; where there is no large difference, an overall Technicians figure is presented.

4.1 Size of employer

The STEM workforce as a whole tends to be based in either small businesses (fewer than 49 employees) or in large businesses (more than 250 employees), with approximately 30% of STEM employees being employed in organisations of this size. Only 19% of STEM workers are based in medium sized businesses (between 50 and 249 employees) and the remainder do not know the size of the employer.

As is the case with demographics, these proportions can differ substantially when investigating the different STEM roles within the workforce. In particular, STEM Managers are much more likely to be employed in small businesses (fewer than 49 employees) with over 50% of Managers being based in this size band. In addition to this, STEM Professionals are most likely to be based in large organisations (over 250 employees). These two findings reflect the nature of these sizes of business, in that large organisations will have a small number of managers who will oversee large departments, whereas most small businesses will have someone based in a managerial role.

Figure 6: Distribution of STEM workforce by size of business and STEM role

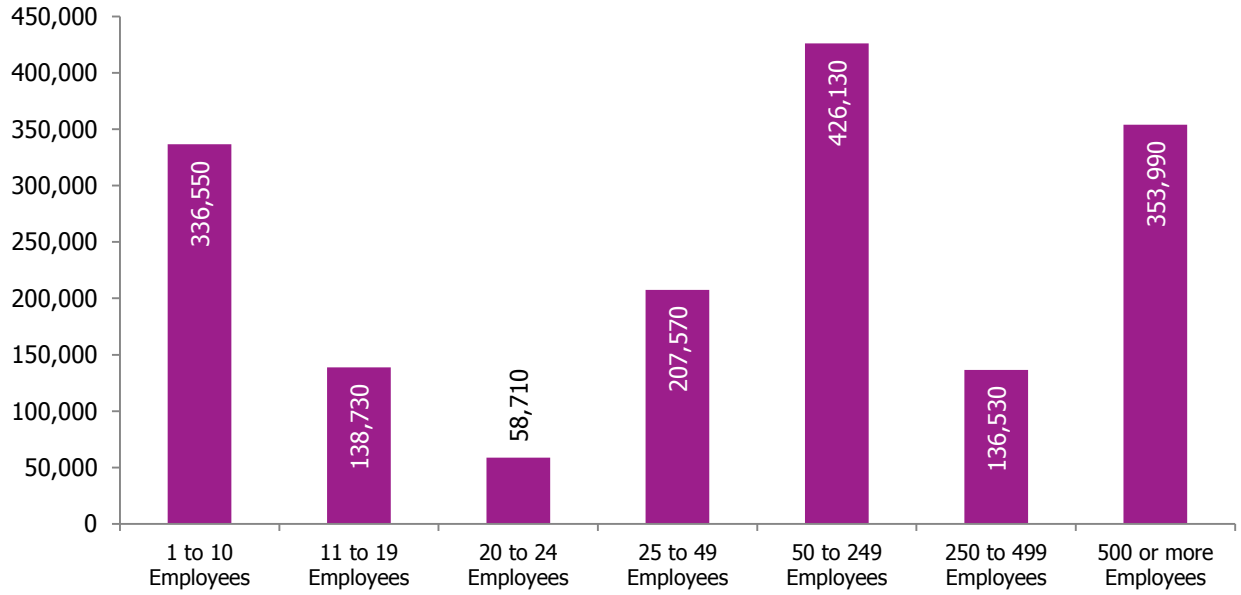


Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S1)

Technicians are most frequently employed within SMEs, with over 55% of the workforce based in businesses employing fewer than 250 employees. However, different patterns emerge for Associate Professionals and Skilled Workers. The Associate Professional workforce in particular follows a similar distribution to that of STEM Professionals with an abundance of Associate Professionals working in large businesses with more than 250 employees. Conversely, Skilled Workers tend to be based in small businesses with fewer than 50 employees and have a similar distribution to the Non-STEM workforce.

When looking at the Technician workforce as a whole in terms of more detailed size bands, there are three peaks of activity which concentrate around micro sized (less than 10 employees), medium sized (50 to 249 employees) and very large (500 or more employees) organisations. The peak for medium sized businesses may be expected given that the size band of 50 to 249 employees is quite wide in range. However, the polarisation of just under one third of employment being in either micro or very large businesses is interesting because it suggests that as a technician you are just as likely to be employed in a micro business as you are in a very large business.

Figure 7: Distribution of STEM technicians by size of business*



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S7c)
* Columns do not total to 100% as 'don't know' is not shown

The following table (Table 10) explores this propensity to work in micro or very large businesses further by examining where there are high proportions of Technicians in particular sized businesses in each sector. The industries where technicians are most prevalent in micro businesses are those that one might expect given the nature of the industry, for example Agriculture & Horticulture (25.5% of Technicians based in micro businesses), Construction & Installation (18.7%) and Creative Industries (16.8%).

Whilst there are large businesses within these three industries they are generally made up of a large number of smaller businesses. It is also worth noting that there are a relatively large number of Technicians working in micro Manufacturing businesses (52,380 Technicians), which is commonly dominated by larger factories.

Table 10: Technicians employed in micro and very large businesses by sector

Sector	1 to 10 Employees		500 or more Employees		Total Technicians
	Number	% of total technicians	Number	% of total technicians	
Advanced Manufacturing	7,320	9.4%	24,300	31.1%	78,250
Aerospace & Space	1,210	2.9%	18,140	44.2%	41,030
Agriculture/Horticulture	13,960	25.5%	1,890	3.4%	54,800
Chemicals	870	5.8%	4,140	27.7%	14,930
Construction & Installation	72,750	18.7%	23,230	6.0%	389,280
Creative	33,080	16.8%	14,910	7.6%	197,110
Energy & Environmental	10,710	12.3%	23,020	26.4%	87,170
Finance	5,860	11.5%	20,010	39.4%	50,820
Food & Drink	980	3.3%	7,900	26.7%	29,630
Health	24,340	15.2%	52,320	32.6%	160,290
ICT	8,600	21.1%	9,360	23.0%	40,710
Logistics	520	3.8%	4,850	35.1%	13,810
Manufacturing	52,380	16.4%	29,360	9.2%	319,450
Metals	5,130	14.0%	5,220	14.2%	36,750
Military	1,440	5.7%	15,580	61.2%	25,470
Mining & Quarrying	0	0.0%	480	14.6%	3,280
Pharmaceuticals	460	3.0%	5,600	37.1%	15,100
Public Sector	5,540	9.3%	23,780	39.9%	59,600
Research & Development	5,580	15.9%	5,960	17.0%	35,080
Secondary Schools	1,540	4.3%	1,520	4.3%	35,530
Tertiary Education incl. FE	830	2.6%	17,700	54.8%	32,280
Textiles	750	15.9%	670	14.2%	4,720
Transport	750	4.6%	4,800	29.4%	16,340
Other	81,970	22.0%	39,270	10.6%	371,760
Total Technicians	**336,550**	**15.9%**	**353,990**	**16.8%**	**2,113,170**
Total Economy	**5,191,900**	**17.8%**	**4,695,990**	**16.1%**	**29,112,510**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S8c)

Turning to very large organisations (500 or more employees), there are a number of industries with an above average proportion of Technicians based in organisations of this size. As was the case with micro businesses, a number of these industries might be anticipated to have a higher proportion than the average due to the nature of the industry. For example, the Military and Public Sector each employee 15,580 and 23,780 Technicians respectively in very large businesses, accounting for over 60% and nearly 40% of their respective Technician workforces.

Other industries that employ high proportions[12] of Technicians in very large organisations, with more than 500 employees, include:

1. Tertiary Education – 17,700 Technicians (or 54.8% of the industry workforce),
2. Aerospace & Space – 18,140 Technicians (44.2% of the industry workforce),
3. Finance – 20,010 Technicians (39.4% of the industry workforce), **and**
4. Pharmaceuticals – 5,600 Technicians (37.1% of the industry workforce).

As with the Military and the Public Sector, one might expect a higher proportion of the Technician workforce to be based in large organisations as it reflects the nature of the industry itself.

[12] This is denoted as more than 35% of the industry's Technician workforce being based in very large organisations.

4.2 Location of employer

The distribution of STEM workers amongst regions of the UK is relatively similar to that of the Non-STEM workforce, as demonstrated in Figure 8 below. However, there are some differences; in particular STEM workers are much more likely to be based in London and the South East than their Non-STEM counterparts due to a large number of people employed in Creative industries.

By comparison, the East Midlands, Wales and Northern Ireland are more likely to employ Non-STEM workers than STEM workers. The remaining regions follow a broadly similar distribution for both the STEM and Non-STEM workforce.

Figure 8: Distribution of STEM & Non-STEM Workforce by Region

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S7)

In terms of density, the South East has the highest concentration of STEM workers with 1,817 workers in every 10,000 being employed in a STEM role. London (1,797 per 10,000), the East of England (1,777) and Scotland (1,757) have similarly high levels of STEM worker densities, further highlighting the strength of STEM in these areas.

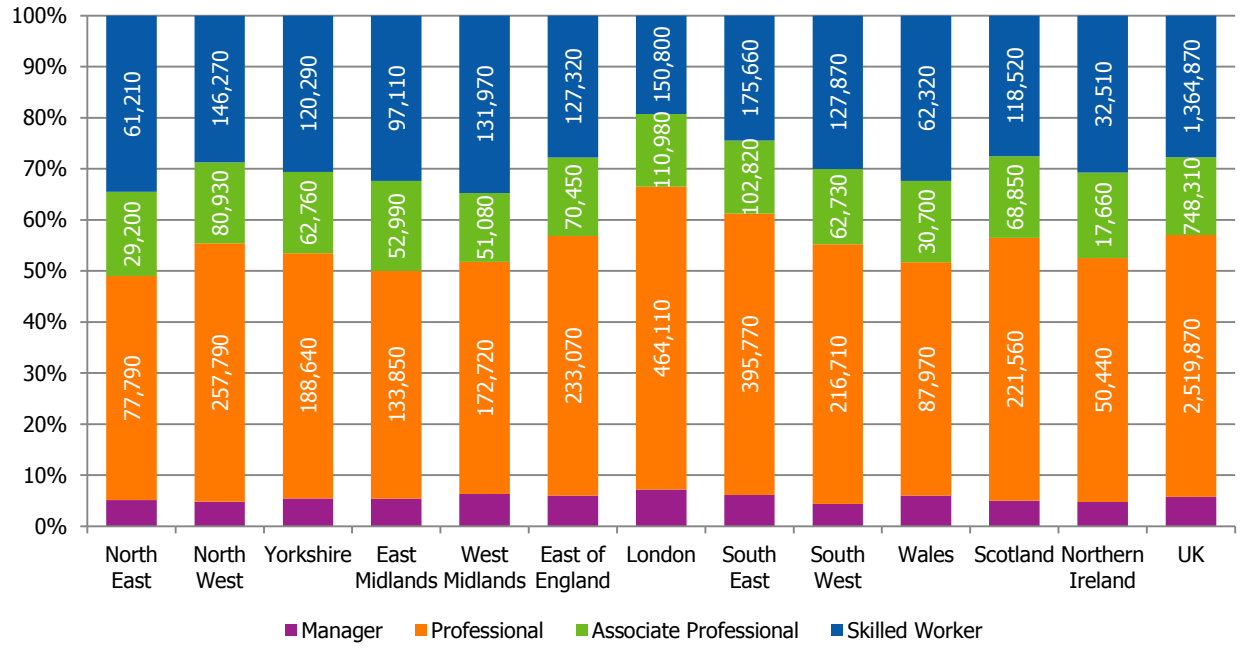
Figure 9: Density of STEM workers per 10,000 employed people

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S7)

Northern Ireland by comparison has a very low density of STEM workers, with only 1,383 in every 10,000 workers being based in a STEM role, which is well below the UK average of 1,689. In fact, the majority of regions have a density of STEM workers below that of the UK average, suggesting that Scotland and the South and East of England are key regions for STEM workers.

Naturally there is likely to be a reliance in different regions on different types of roles. This is explored in Figure 10, which highlights some interesting variances between the regions. Perhaps the most interesting finding is that Associate Professionals make up a relatively consistent proportion of each region's STEM workforce (approximately 16% on average). Given that the top employing industry for Associate Professionals is Health; this consistency could be because the Health sector is fairly well embedded across all regions.

Figure 10: Breakdown of STEM workforce in each region by STEM role



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S7)

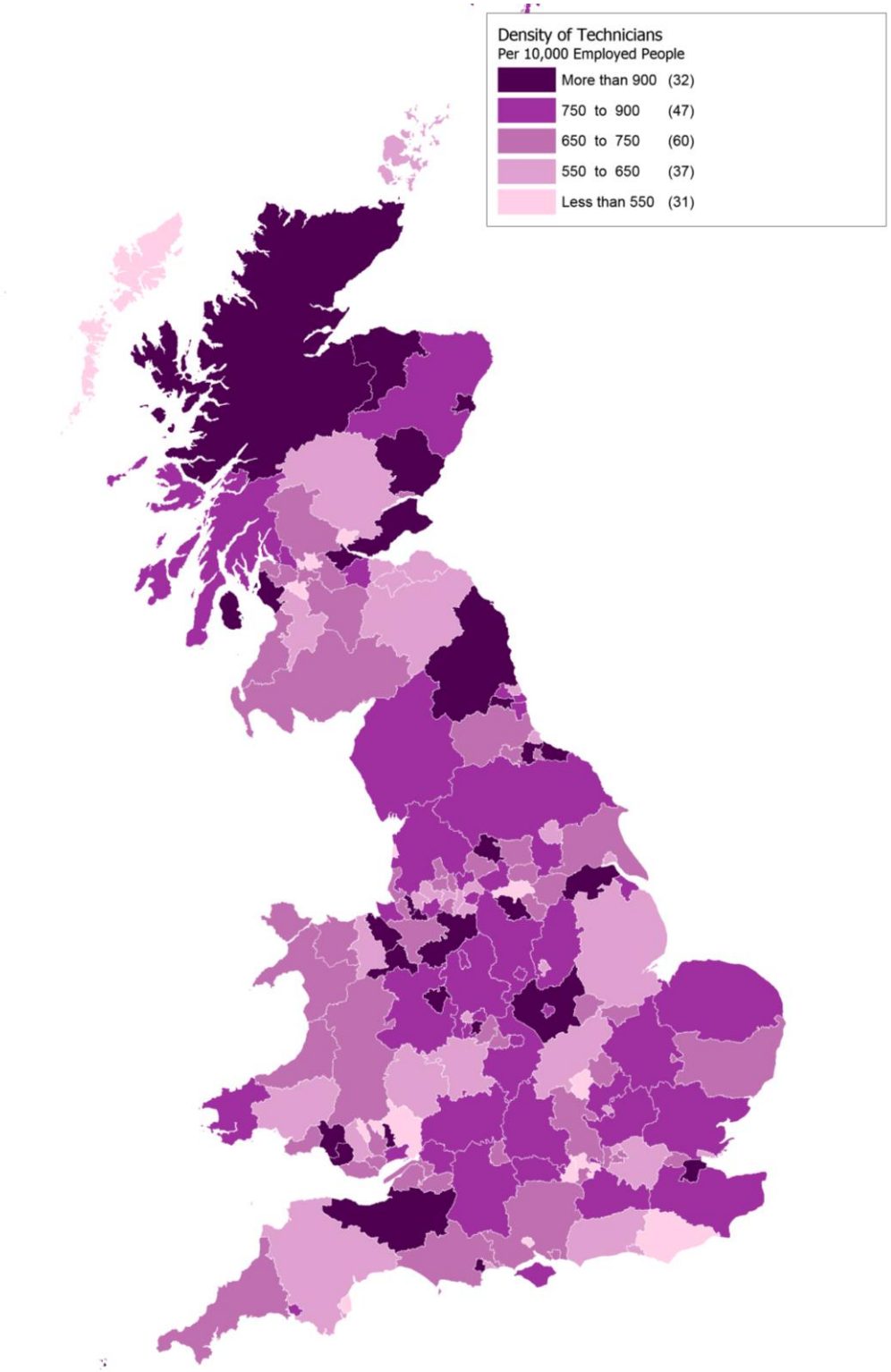
This consistency in Associate Professionals across regions can also be seen within STEM Managers, which highlights that it is actually in the presence of Skilled Workers and Professionals where each region differs. The proportion (and quantum) of Professionals in London is significantly higher than other regions, and as a result the reliance on Skilled Workers is much lower.

By comparison, the North East of England employs a much higher proportion of Skilled Workers than London and when combined with Associate Professionals, we see that over 50% of the North Easts STEM workforce is employed in Technician roles – greater than any other region. The West Midlands employs a slightly higher proportion of Skilled Workers to that of the North East, but fewer Associate Professionals, meaning that the overall proportion of the workforce that are Technicians is slightly lower than 50%. The East Midlands and Wales have similar levels of Technicians to that of the North East and West Midlands but have a greater reliance on Associate Professionals than Skilled Workers.

Interestingly the regions identified as having the highest density of STEM workers (Scotland, London, the South East, South West, London and East of England) generally have a smaller proportion of Technicians within their workforce, indicating that it is the higher numbers of Professionals driving these results.

Switching focus to Technicians, the following map highlights those areas across the UK where there are concentrations of Technicians within local workforces in terms of density per 10,000 employed people.

Figure 11: Map highlighting density[13] of Technicians across the UK

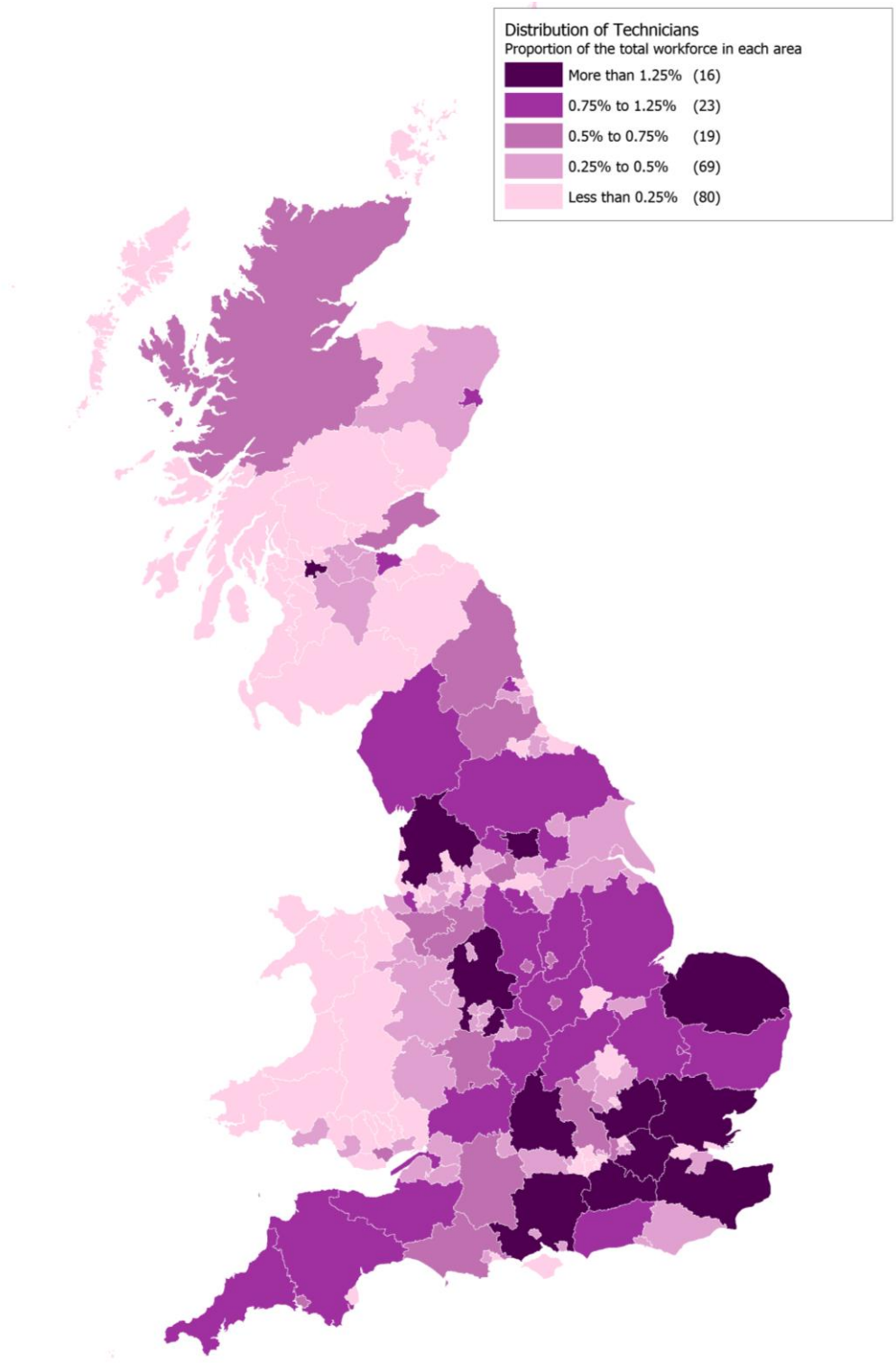


Source: TBR using Annual Population Survey July 2012 – June 2013

[13] Per 10,000 employed people (e.g. for every 10,000 people in employment, there are 726 STEM Technicians)

It is clear that there are certain areas where the density of Technicians within the local employment population is significant. In particular the North of Scotland, the North East of England, Leicestershire and Somerset appear to have high concentrations of Technicians within their local economy. The proportion of the overall Technician workforce in these areas may be lower than other areas (as shown in Figure 12), but it shows that the Technicians are particularly prevalent within these local economies.

Figure 12: Map highlighting distribution of Technicians across the UK



Source: TBR using Annual Population Survey July 2012 – June 2013

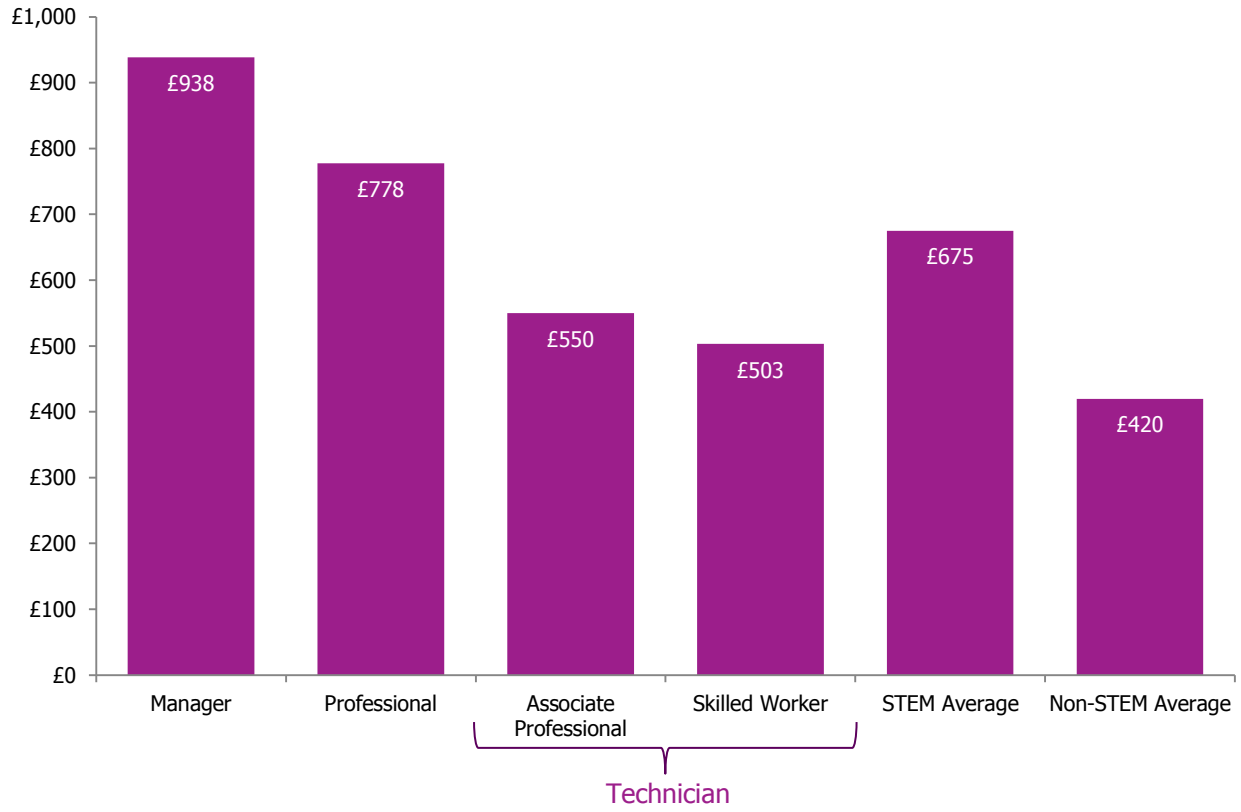
Whilst the density was much higher in the North East of England and the North of Scotland, it is clear that the majority of Technicians are based in the South (particularly in London and its surrounding counties) and in Lancashire, Leeds, Staffordshire, Hampshire and Norfolk.

There also strong concentrations in the Midlands and the rest of the North West, as well as the South West and Yorkshire. In Scotland, Technicians appear to be concentrated around the main cities of Glasgow, Edinburgh and Aberdeen, although there does appear to be a relatively strong concentration in the Highlands too. Combined with the findings on density it suggests that Technicians are particularly prevalent in the Highlands of Scotland.

4.3 Remuneration of STEM technicians

On average, the STEM workforce as a whole commands a higher average weekly salary than that of the Non-STEM workforce, with STEM workers earning approximately £675 per week compared to £420 in Non-STEM jobs.

Figure 13: Average weekly salary of STEM workforce



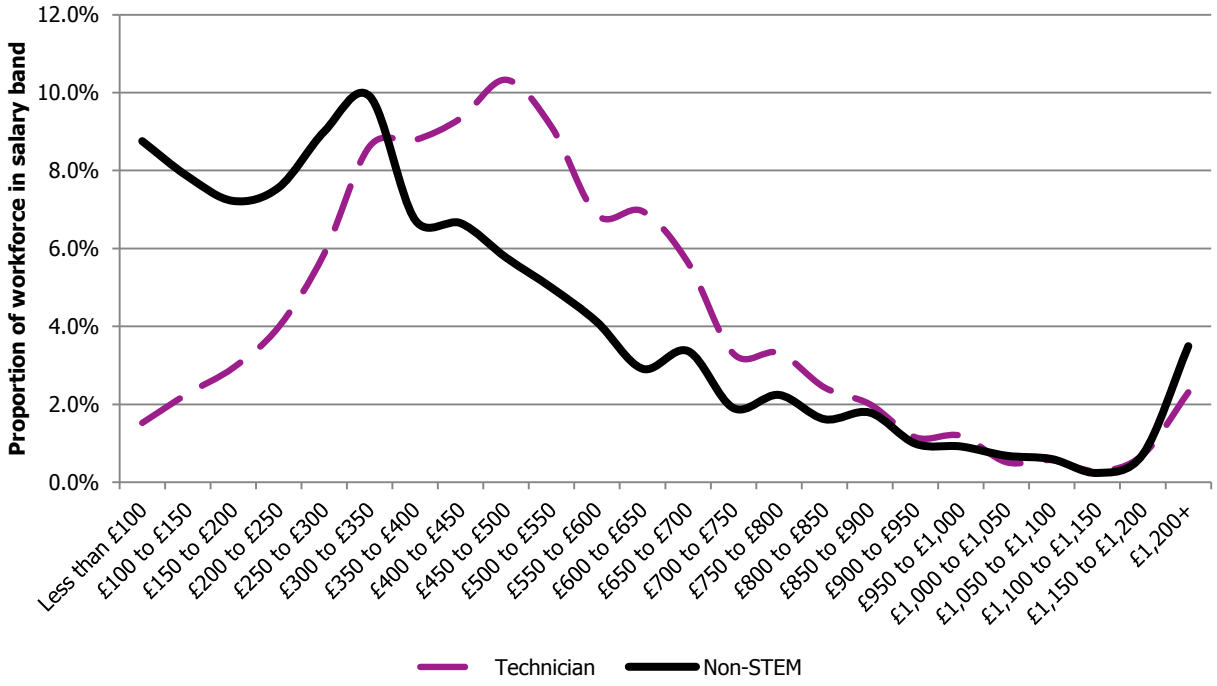
Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S15a)

The overall STEM average is driven by STEM Managers and Professionals being paid extremely well, with average salaries of £938 per week and £778 per week respectively. Both Technician types are still relatively well paid, with an average weekly salary £106 higher than the Non-STEM average (of £420 per week), however Associate Professionals command a higher wage than those in a Skilled Worker role.

Moving away from average salaries to consider the distribution of the population across weekly salary bands, it is clear that there is a much higher proportion of Technicians receiving weekly salaries greater than £350 and less than £900 each week, when compared to the distribution of the Non-STEM workforce.

The proportion of Technicians earning less than £350 a week is significantly lower than the Non-STEM average. Interestingly the distribution of Technicians earning more than £900 per week is very similar to that of the wider Non-STEM workforce, indicating that Technicians are equally as likely to earn a higher wage as a worker in a non-STEM role. However, there is a relatively low proportion of people earning very high salaries in each case, although Technicians are less likely to earn a salary over £1,200 a week than workers in the wider Non-STEM workforce.

Figure 14: Distribution of workforce amongst different salary bands



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S15b)

Whilst STEM workers in general command a higher wage than that of non-STEM workers, there is a large difference in average salary. In particular, jobs in Finance and Technology disciplines command a particularly high wage premium from employers across the STEM workforce as a whole and in the Technician workforce.

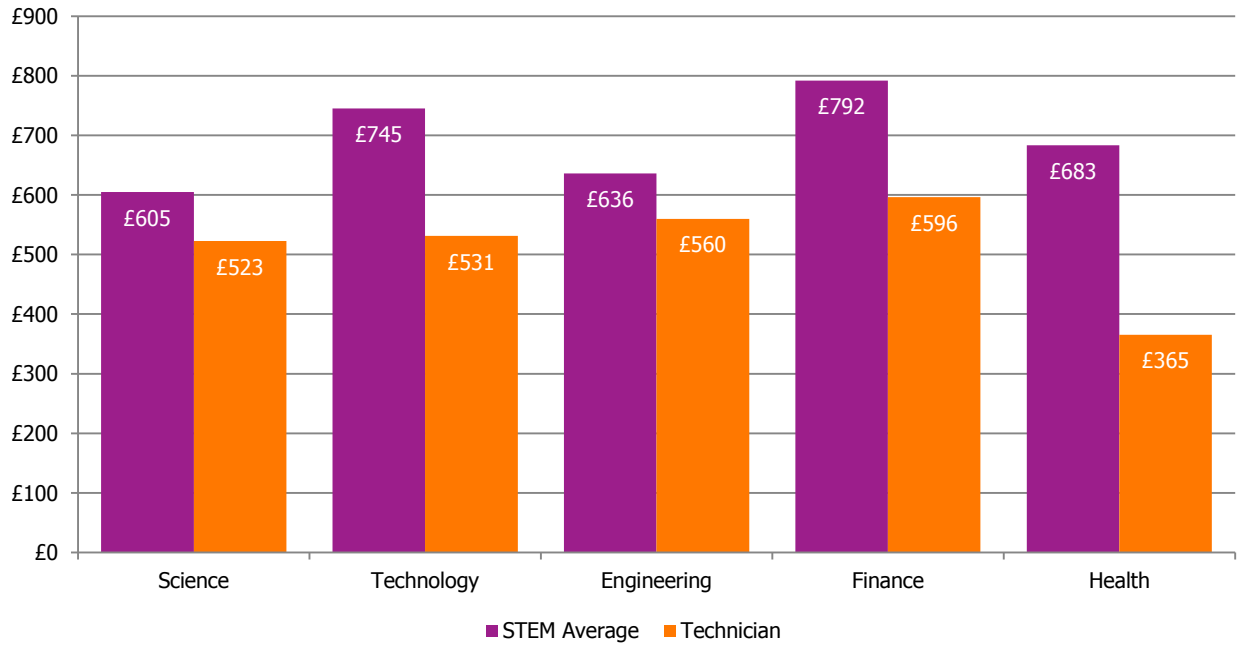
Table 11: Average weekly salary of STEM workforce by STEM discipline and group

STEM Group	Science	Technology	Engineering	Finance	Health
Manager	£0	£1,090	£862	£1,050	£902
Professional	£680	£808	£754	£888	£798
Technician	£523	£531	£560	£596	£365
Associate Professional	*£444*	*£551*	*£591*	*£727*	*£456*
Skilled Worker	*£602*	*£511*	*£529*	*£465*	*£275*
STEM average	**£605**	**£745**	**£636**	**£792**	**£683**

Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S13)

In fact, Finance based Technicians in particular are the best paid across the Technician workforce with an average salary of £596 a week, closely followed by Engineering Technicians with an average salary of £560 a week. By comparison, Health based Technicians are paid very poorly at £365 a week, almost £160 less than the average for Technicians. However, it is worth noting that Health based Skilled Workers are the only role that earn less than the Non-STEM average (£275 per week compared to £420 per week on average).

Figure 15: Average weekly salary of STEM workforce by STEM discipline



Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S15a)

Breaking this down further in to the two Technician sub-types of Associate Professional and Skilled Worker highlights some key differences between the groups. For example, the wage premium for Technicians in Skilled Worker roles is much higher for those in a Science discipline than any other (as highlighted in Table 11 above). This is particularly interesting as only 4.9% of the Science workforce is employed as Skilled Workers, but they command almost the same weekly salary (of £602) as Science based Professionals (£680) and considerably more than Science based Associate Professionals (£444). This appears to be driven primarily by Chemical & Related Process Operatives (SOC 8114), which have a particularly high average salary of over £800 per week.

The same effect is also evident within the Engineering discipline, where there are proportionally fewer Associate Professionals than Skilled Workers (13% of STEM workers in an Engineering discipline are Associate Professional compared to 46.5 % for Skilled Workers), however the difference in wages is much smaller (£591 for Associate Professionals compared to £529 for Skilled Workers).

Health based Technicians commanded the lowest weekly salary of all Technicians (£365), and there is a large gap between the wages of Skilled Worker and Associate Professionals, with the latter having an average weekly salary of £456 (£12 higher than that of Science based Associate Professionals), compared to Skilled Workers with an average weekly salary of just £275 per week. Each group of Technicians make up similar proportions of the Health workforce (11% associate professional and 13.9% skilled worker), presenting a slightly different trend to those described above for the Engineering and Science disciplines.

Finance based Technicians also present an interesting case, with Skilled Workers making up the second smallest proportion of the Finance workforce (17.6%) and command the second lowest wage of all Skilled Workers (at £465 per week). By comparison Associate Professionals are paid extremely well when employed in a Finance discipline, with an average salary of £727 per week, higher than Associate Professionals in any other discipline.

Naturally different industries will command different wage premiums and this is explored in Table 12 over the page.

In particular we find that the most highly paid Technicians are based within the Energy & Environmental sector (with an average salary of £742 per week) and this is followed closely by those employed in Transport (£705 per week). These two industries also pay Associate Professionals well, with average salaries of £756 per week in Energy & Environmental and £743 per week in Transport. The same can also be said for the Logistics and Finance sectors, where Associate Professionals have an average salary of around £730 per week, significantly more than their Skilled Worker counterparts.

One might anticipate that a smaller supply of Technicians would drive wages up in certain sectors. This may be the case in some of the higher paying sectors where the number of technicians is in the tens of thousands (such as Transport, Logistics or Chemicals), but doesn't necessarily explain higher wages in the larger employing sectors. This may instead reflect sectoral conditions and the unique demands of the role outweighing other factors in terms of wage premia.

This may also be the case for those sectors where Skilled Workers earn more than Associate Professionals (e.g. Chemicals, ICT, Pharmaceuticals, Research & Development, Advanced Manufacturing, Textiles, Food & Drink, Mining & Quarrying and Secondary Schools) or alternatively it may be a reflection of where graduates are taken on in Associate Professional roles at a lower starting salary, which is then used as a stepping stone to a Professional role.

Interestingly, of all the industries analysed in this paper, approximately two thirds have an average weekly salary that is higher than the overall Technician average, suggesting the majority of Technicians are well paid.

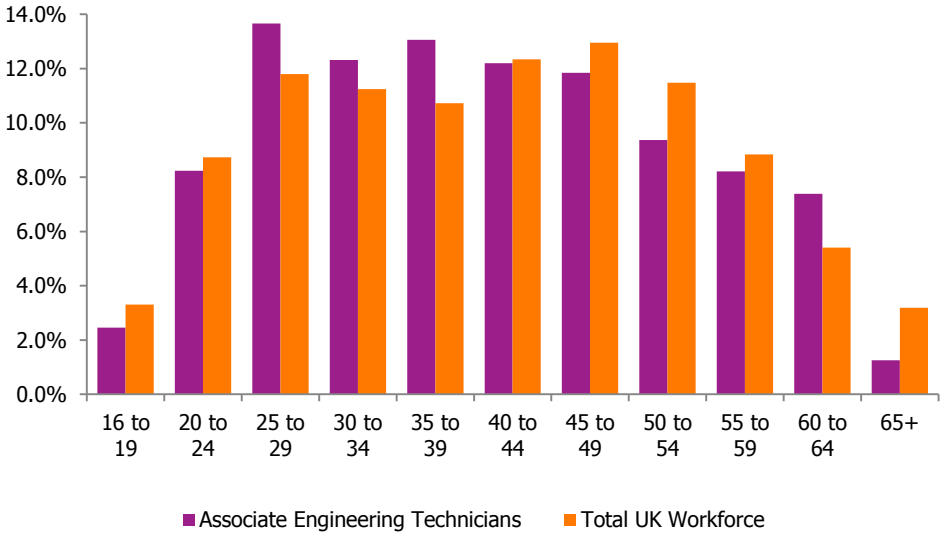
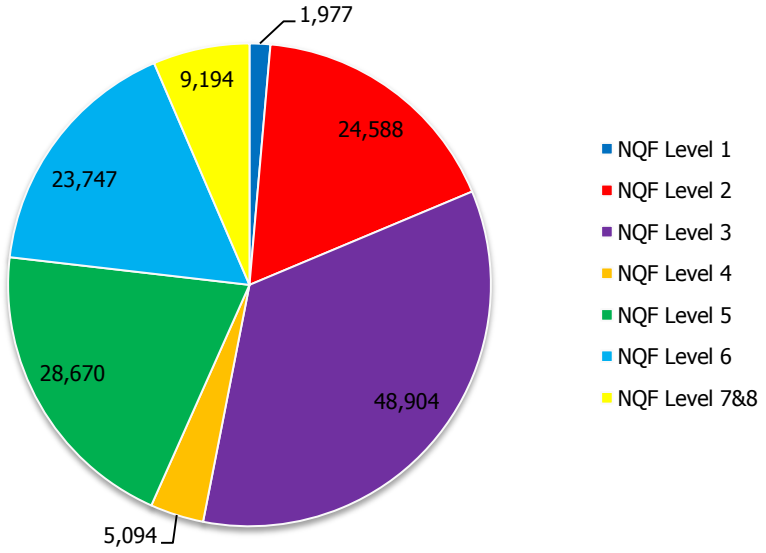
Table 12: Average weekly salary of STEM technicians by sector (with employees)

Sector	Technician Total		*Associate Professional*		*Skilled Worker*	
	Average Salary	Employees	*Average Salary*	*Employees*	*Average Salary*	*Employees*
Energy & Environmental	£742	87,170	*£756*	*33,610*	*£727*	*53,560*
Transport	£705	16,340	*£743*	*7,210*	*£667*	*9,140*
Logistics	£674	13,810	*£734*	*5,640*	*£615*	*8,170*
Finance	£653	50,820	*£728*	*43,170*	*£578*	*7,660*
Chemicals	£617	14,930	*£575*	*6,150*	*£659*	*8,790*
Aerospace & Space	£611	41,030	*£670*	*20,260*	*£551*	*20,770*
Military	£600	25,470	*£621*	*15,650*	*£580*	*9,810*
Metals	£600	36,750	*£700*	*4,290*	*£500*	*32,460*
ICT	£587	40,710	*£578*	*18,010*	*£597*	*22,700*
Pharmaceuticals	£572	15,100	*£548*	*11,340*	*£596*	*3,760*
Research & Development	£566	35,080	*£484*	*28,570*	*£648*	*6,510*
Advanced Manufacturing	£563	78,250	*£555*	*23,450*	*£572*	*54,800*
Construction & Installation	£562	389,280	*£620*	*48,590*	*£504*	*340,690*
Textiles	£556	4,720	*£466*	*2,380*	*£646*	*2,340*
Food & Drink	£552	29,630	*£518*	*9,590*	*£585*	*20,040*
Creative	£551	197,110	*£568*	*69,020*	*£534*	*128,080*
Technician Average	**£526**	**2,113,170**	***£550***	***748,310***	***£503***	***1,364,870***
Manufacturing	£518	319,450	*£548*	*51,770*	*£488*	*267,680*
Mining & Quarrying	£505	3,280	*£371*	*1,150*	*£638*	*2,130*
Public Sector	£504	59,600	*£555*	*45,830*	*£453*	*13,760*
Tertiary Education incl. FE	£461	32,280	*£471*	*24,360*	*£451*	*7,920*
Health	£404	160,290	*£481*	*95,630*	*£326*	*64,670*
Agriculture/Horticulture	£395	54,800	*£458*	*8,740*	*£333*	*46,060*
Secondary Schools	£348	35,530	*£319*	*30,370*	*£377*	*5,160*
Other Industries	£480	371,760	*£500*	*143,540*	*£460*	*228,220*

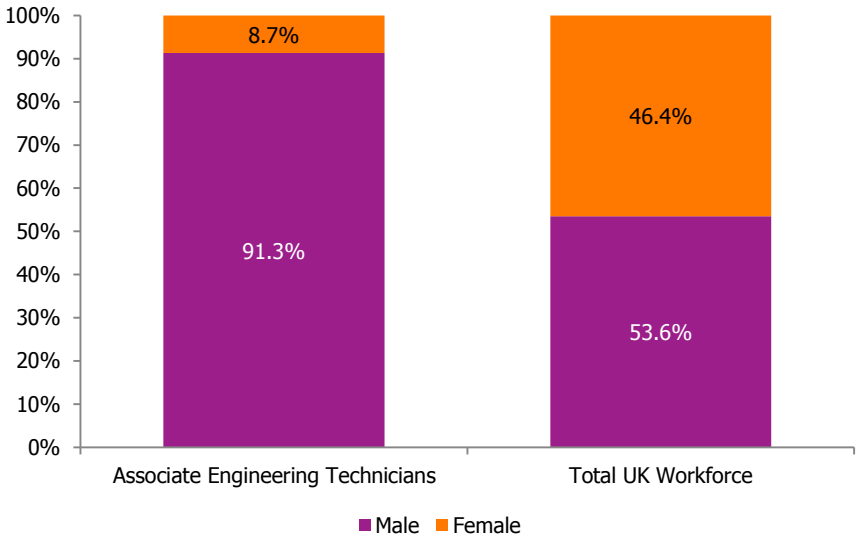
Source: Annual Population Survey July 2012 – June 2013 (TBR Ref: W2/S15a)

5. Case studies

5.1 Associate professional engineering technicians

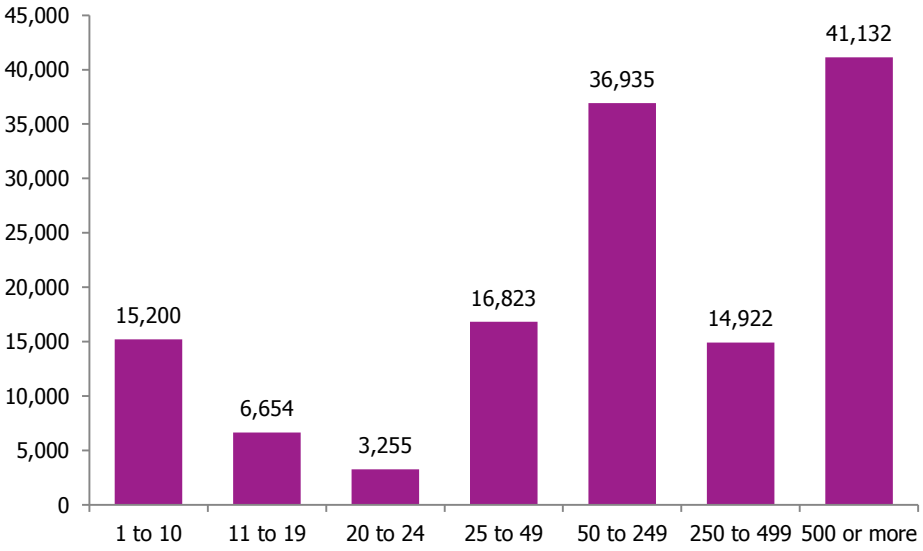
Associate Engineering Technicians (SOCs 3112, 3113, 3114, 3115)	
How many are there?	150,360 people are employed as associate engineering technicians across the UK.
Who are they?	They tend to be more concentrated in the 25-39 age band than the rest of the UK workforce (39% compared to 34%). Additionally, proportionally fewer are aged 50+ (26% compared to 29%).  Their highest level of qualification is most likely to be up to level 3. However, many also have highest qualifications at level 5 or level 6. 

Just over 13,000 women are employed as associate engineering technicians and 137,310 men. This results in a gender balance that is well below the UK workforce average.

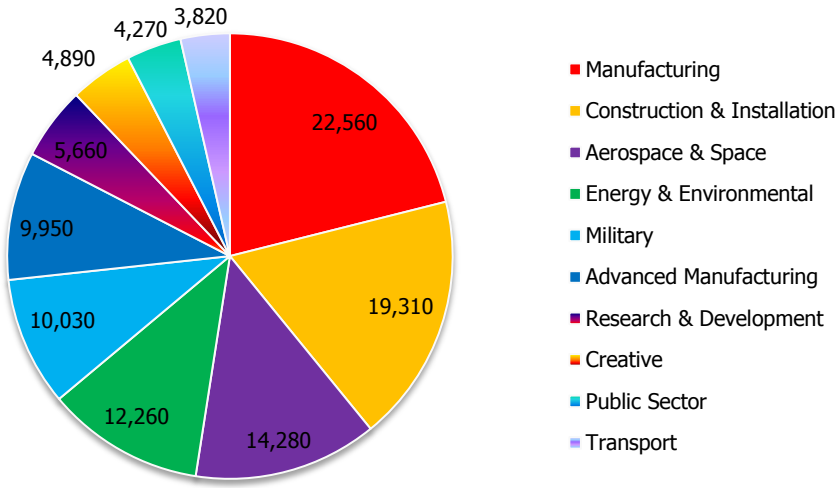


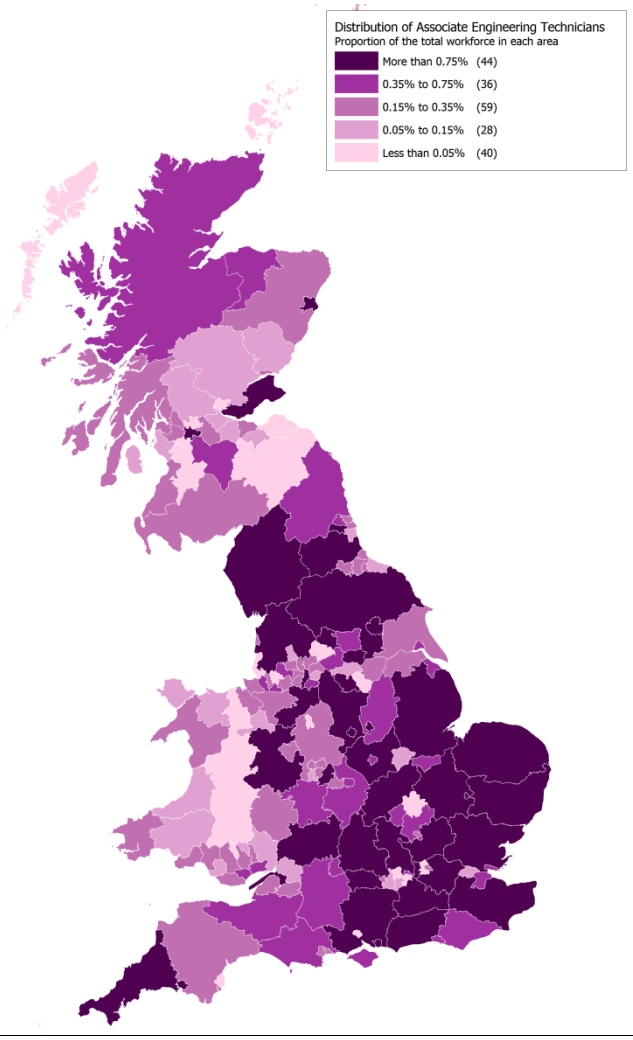
Who employs them?

Associate engineering technicians are most likely to be employed in medium/large businesses – just under 93,000 (69%) work in firms with 50 or more employees.



The top ten employment sectors for associate engineering technicians represent 71% of the workforce (103,210 employees), with Manufacturing and Construction & Installation being the most prevalent activities.



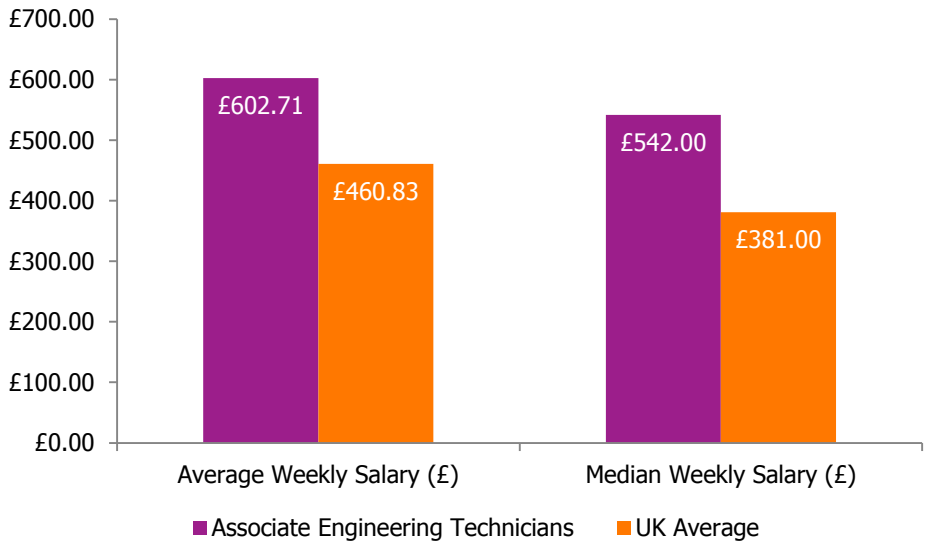


The majority of Associate Professional Engineering Technicians are based in the South East, London and the East of England.

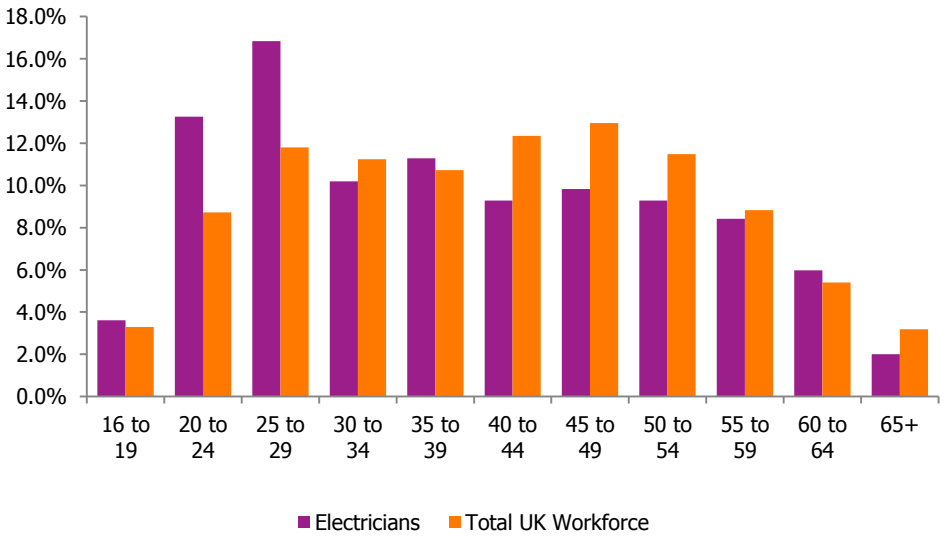
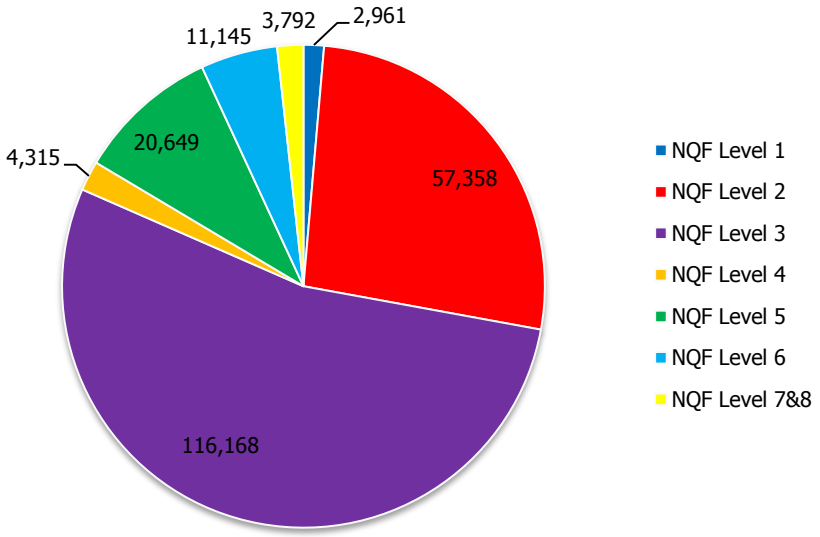
However there are also strong concentrations within the North West of England, South Yorkshire and Cornwall.

Scotland also shows strengths in the areas of Aberdeen, Glasgow and Dundee.

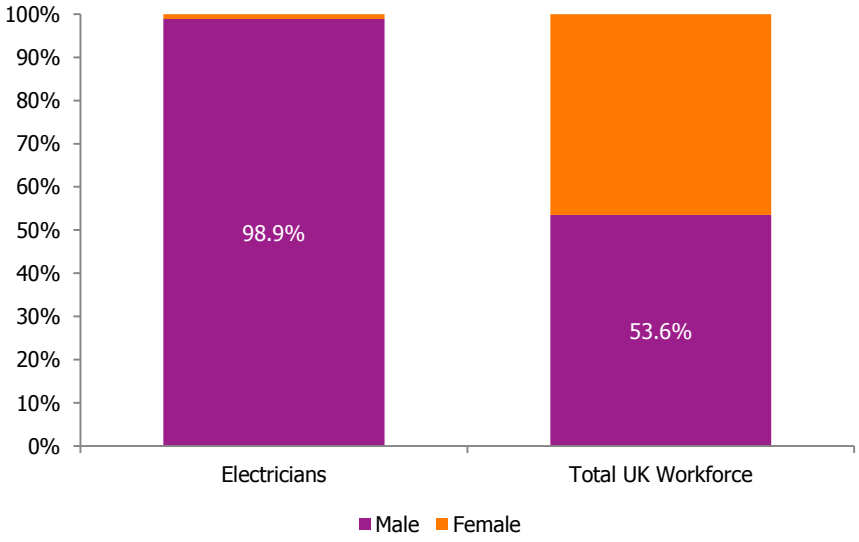
How much do they earn?	Associate engineering technicians earn a significantly higher wage than the UK Average in both mean and median terms.



5.2 Electricians

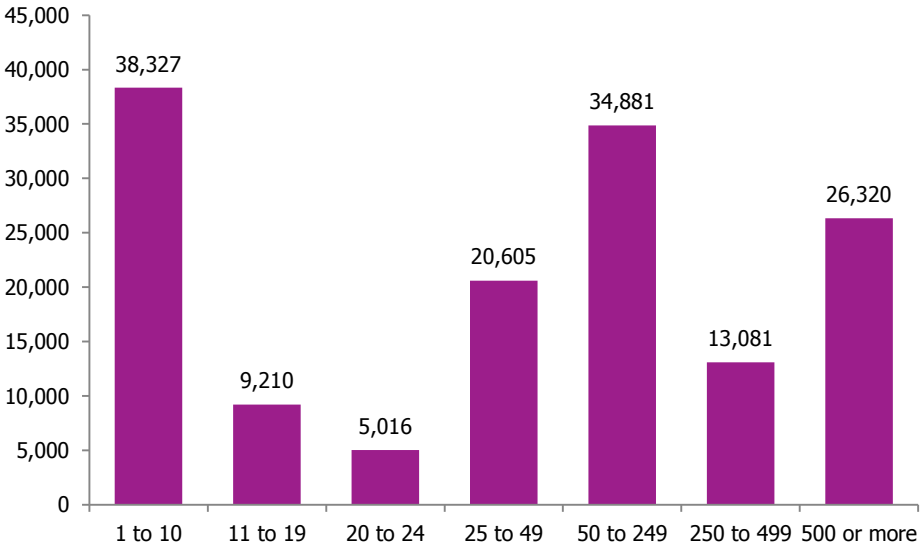
Electricians (SOC 5241)	
How many are there?	227,890 people are employed as electricians across the UK.
Who are they?	They tend to be more concentrated in the 25 to 29 (16.8%) and 20 to 24 (13.3%) age brackets, especially when compared with the rest of the UK workforce (11.8%, and 8.7%, respectively).  The majority of electricians – over half – have a level 3 as their highest qualification, and around a quarter (27%) have a highest qualification at level 2. 

Only 1.1% of Electricians are female, suggesting a huge gender imbalance in this occupation.

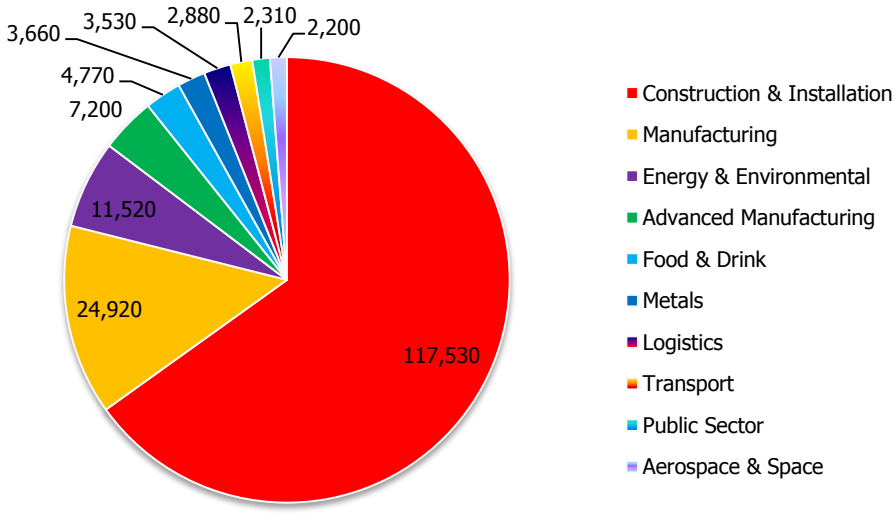


Who employs them?

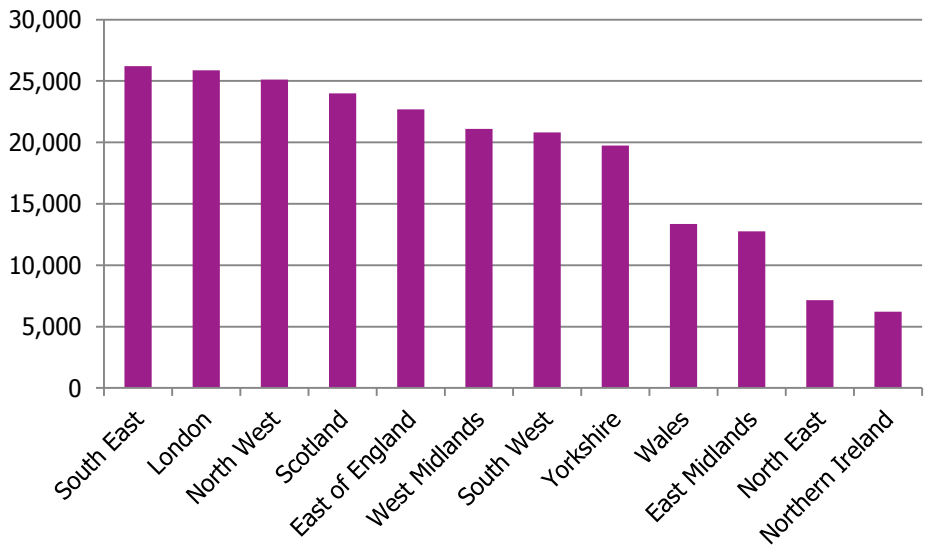
Electricians are most likely to be employed in very small or medium/large businesses. Over 38,000 work in firms with 1 to 10 employees, and nearly 35,000 are employed in firms with 50 to 249 staff.



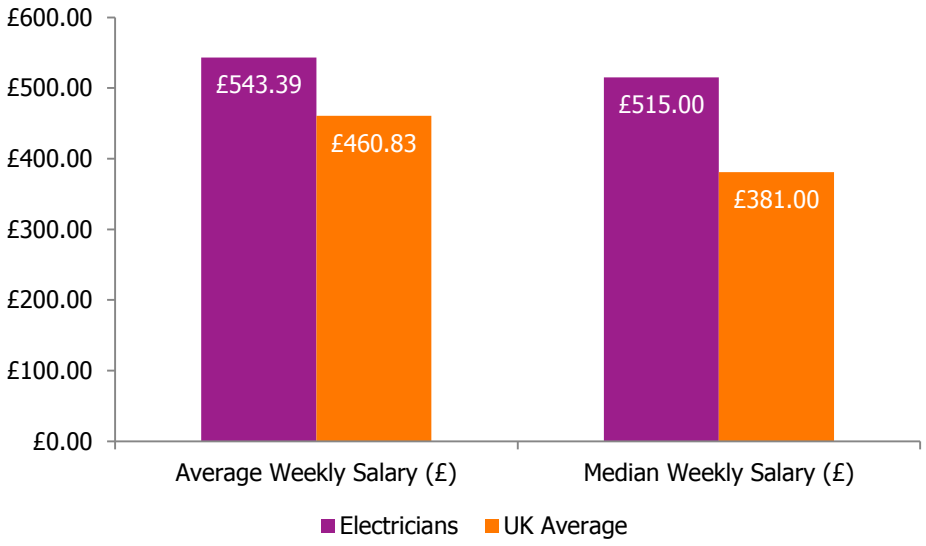
The top 10 industries employing Electricians (see below) account for 79% of the total workforce and the majority of these work in Construction and Installation.



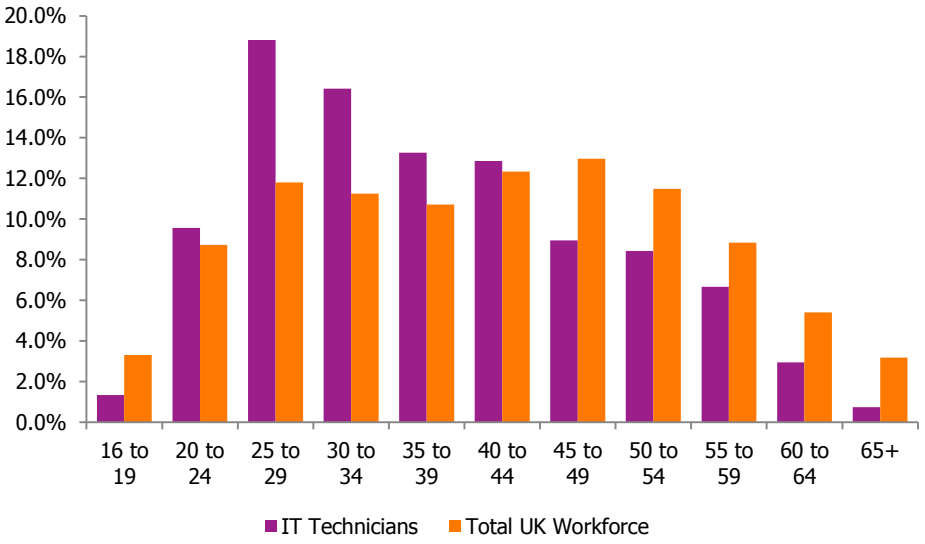
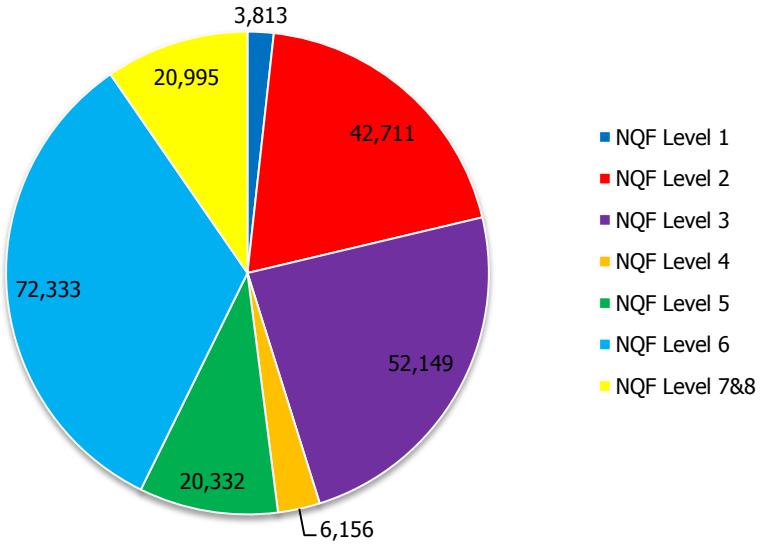
Electricians are mainly based in the South East, London and the North West of England, with each area containing over 25,000 Electricians. There is a relatively even spread amongst Scotland and the other regions within England, with the exception of the East Midlands and North East, which have comparatively fewer Electricians.



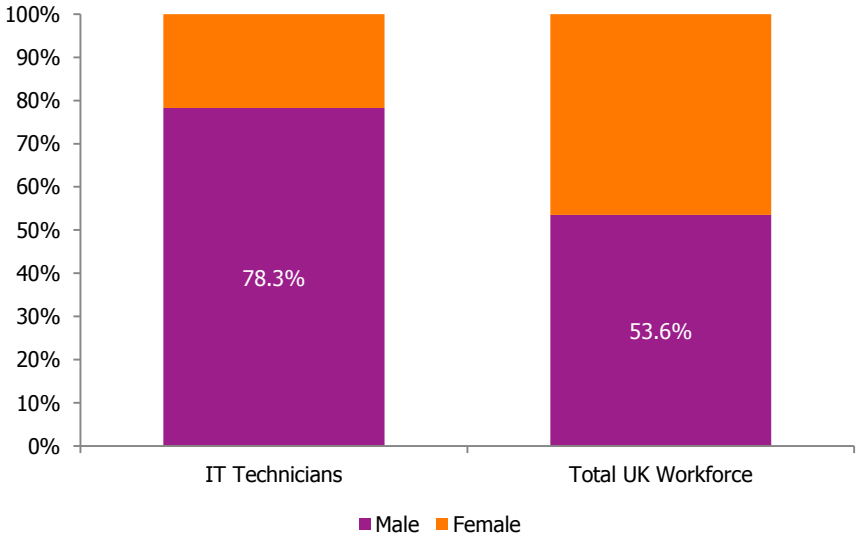
How much do they earn?	On average Electricians earn over £540 per week (gross), which is over £80 a week more than the mean UK average. In terms of median salary they earn over £130 a week more than the UK median salary.



5.3 IT Technicians

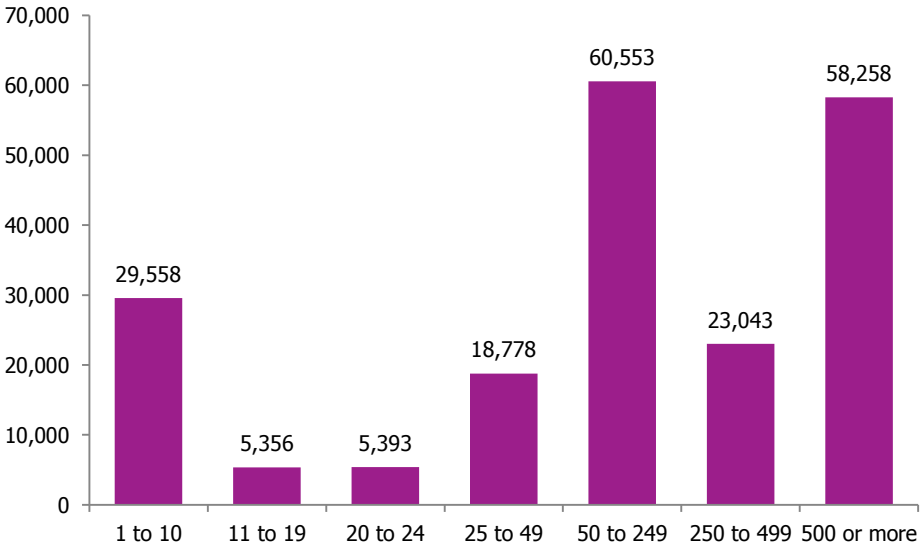
IT Technicians (SOCs 3131, 3132, 5245, 9511)	
How many are there?	231,440 people are employed as IT Technicians across the UK.
Who are they?	IT Technicians are concentrated in the 25 to 44 age bracket, with lower numbers falling into the 16 to 19 and 45+ categories compared to the UK workforce.  One third (72,330) of IT Technicians possess a level 6 qualification as their highest qualification. 

There are more men employed as IT Technicians, with this bias being highlighted by a 78.3%:21.7% split between male and female

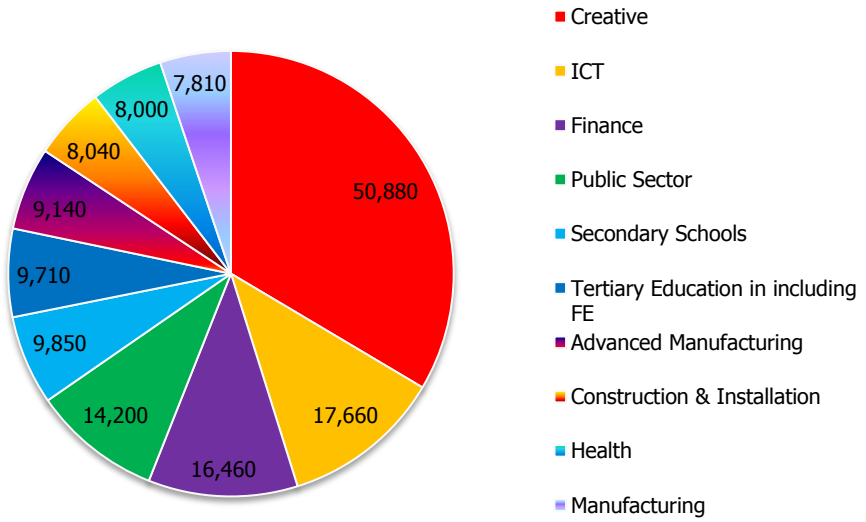


Who employs them?

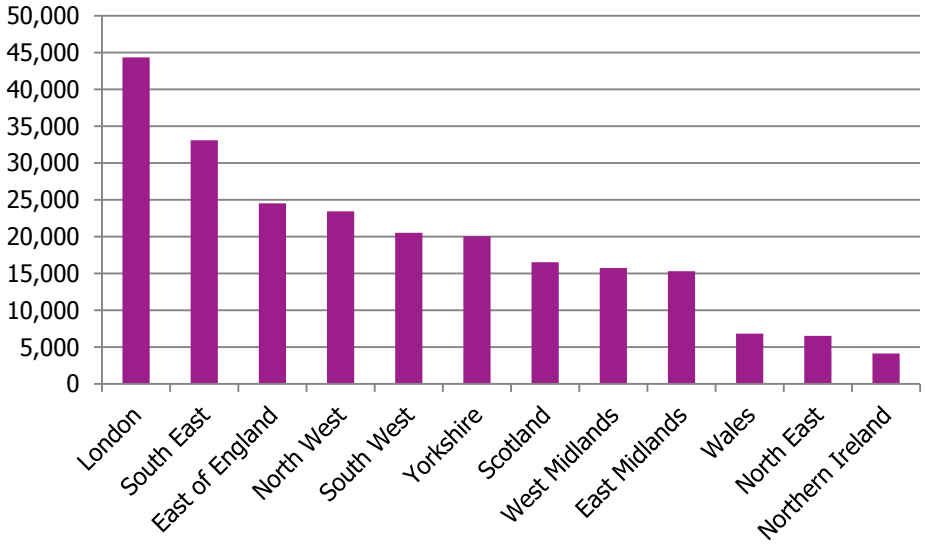
IT Technicians are most likely to be employed in medium/large businesses, with 50 employees or more, specifically businesses employing between 50 and 249 employees or employing over 500 people.



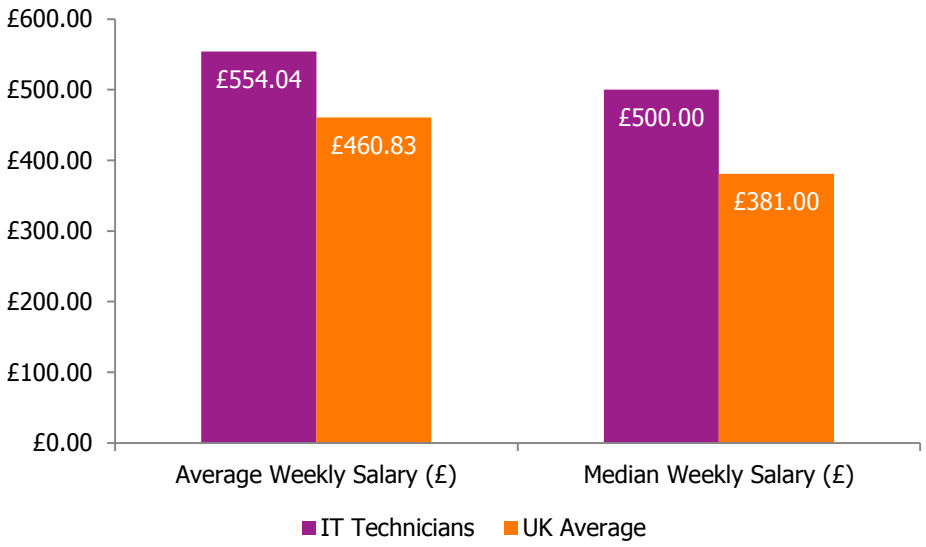
The top 10 employment sectors for IT Technicians represent 66% of the workforce, suggesting there is more variability amongst industries. The majority of IT Technicians (22% of all technicians) work in the Creative Sector as user support or IT operations within Computer consultancy organisations (SIC 62.02). The second most popular sector being the ICT sector itself, employing 8% of IT Technicians.



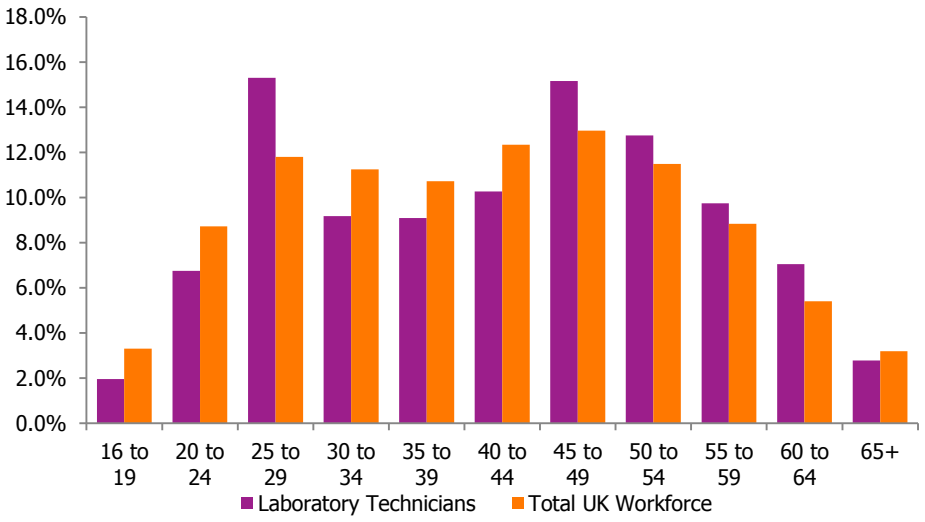
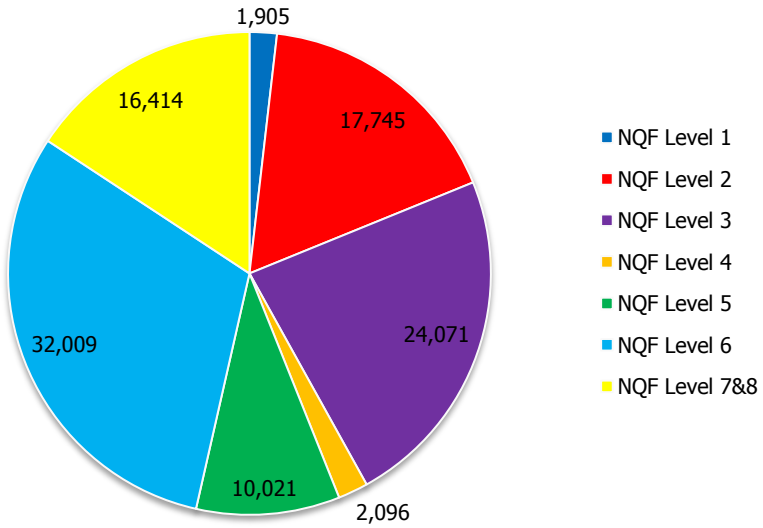
London is the largest employer of IT Technicians, with nearly 45,000 workers based there. This is followed by the South East of England with approximately 33,000 IT Technicians. The rest of the IT Technician workforce is relatively well spread amongst the other UK regions, with the exception of Wales, the North East of England and Northern Ireland which each hold approximately 5,000 workers.



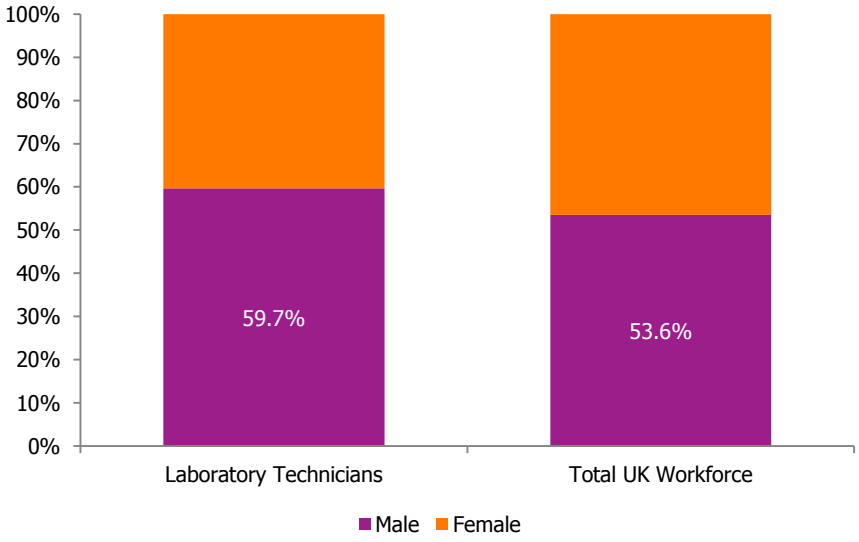
How much do they earn?	IT Technicians command a much higher salary than the UK average in terms of mean and median weekly salaries (gross).



5.4 Laboratory Technicians

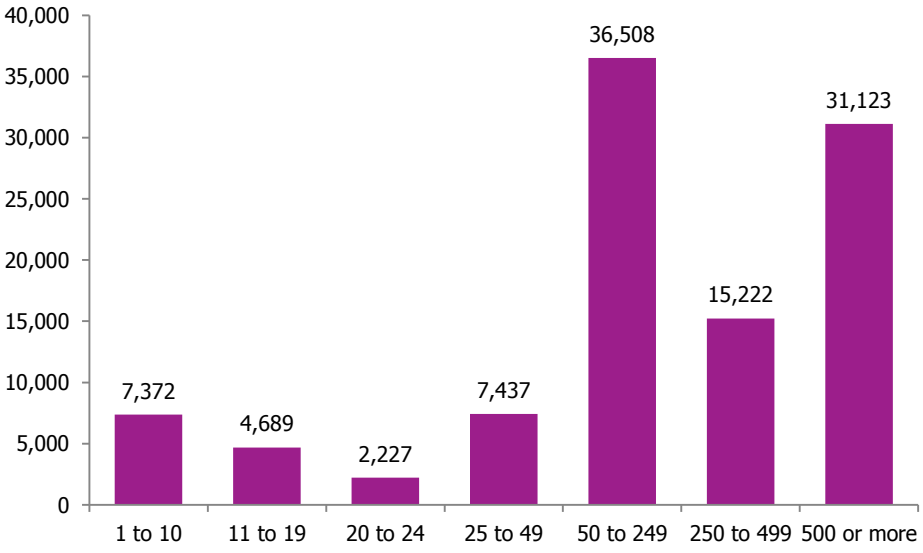
Laboratory Technicians (SOCs 3111, 3119)	
How many are there?	113,160 people are employed as Lab Technicians across the UK.
Who are they?	They tend to be more concentrated in the 25 to 29 and 45 to 49 categories (15.3% and 15.2% respectively). 
	Level 6 is the highest qualification for nearly one third (31%) of Laboratory Technicians. The remaining Laboratory Technicians tend to possess either a level 3 (23%), a level 2 (17%) or level 7&8 (16%) qualification as their highest qualification. 

There is a 60%:40%, male to female split of Lab Technicians. This is not dissimilar to the gender split witnessed in the total UK workforce.

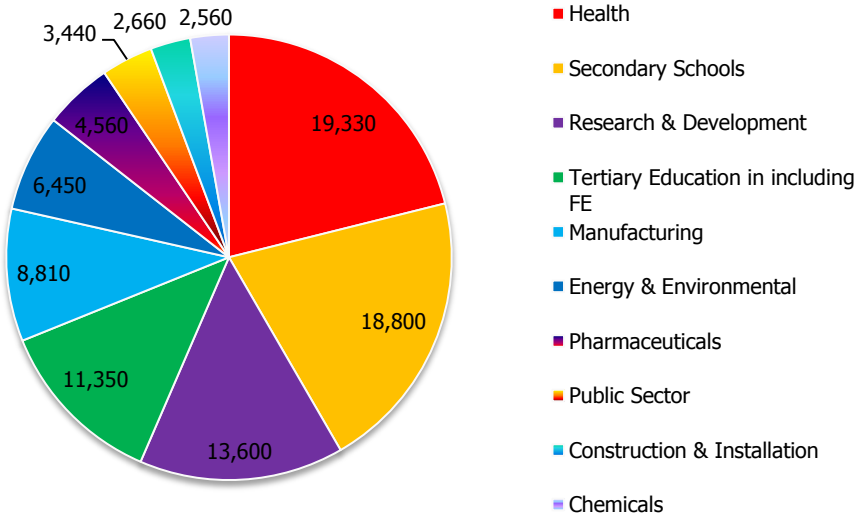


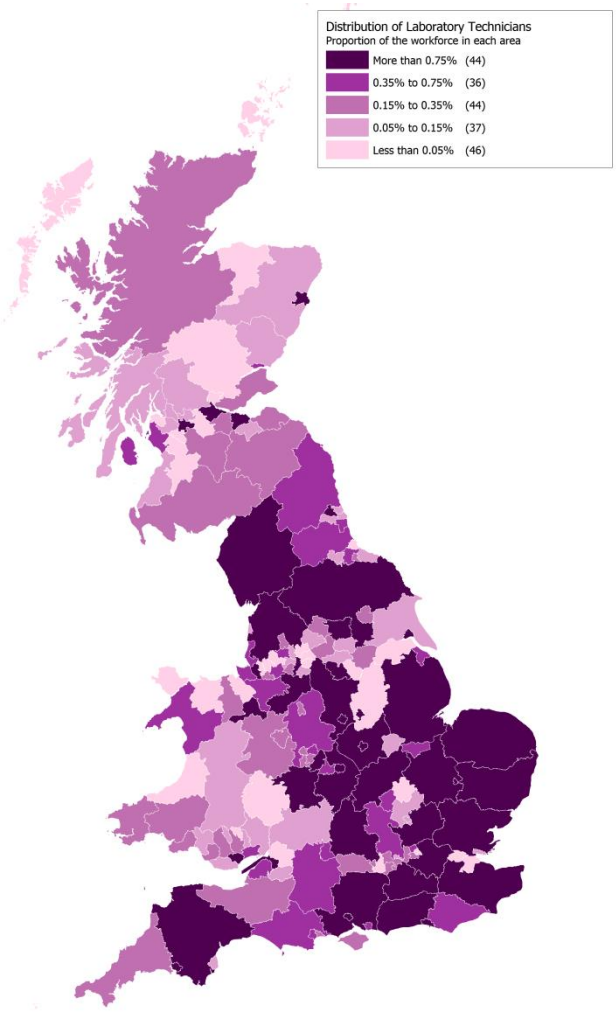
Who employs them?

Lab Technicians are most likely to be employed in medium/large businesses, with 50 employees or more, specifically those with between 50 and 249 employees or 500 or more employees.



The top ten industries for Laboratory Technicians represent 81% of the workforce. Laboratory Technicians are most prevalent in the Health sector and within Secondary Schools, with nearly 19,000 individuals working in each sector. The next most prevalent sector is Research and Development, with over 13,500 technicians.

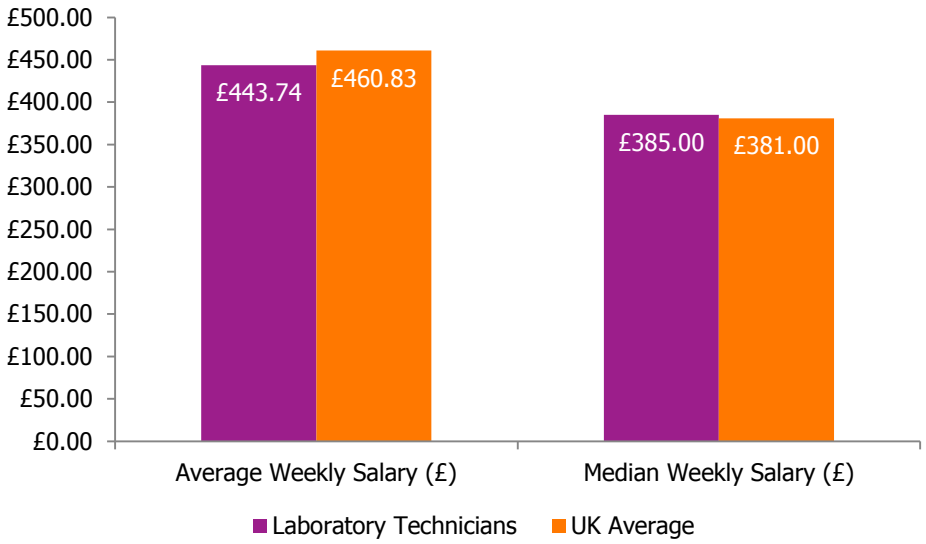




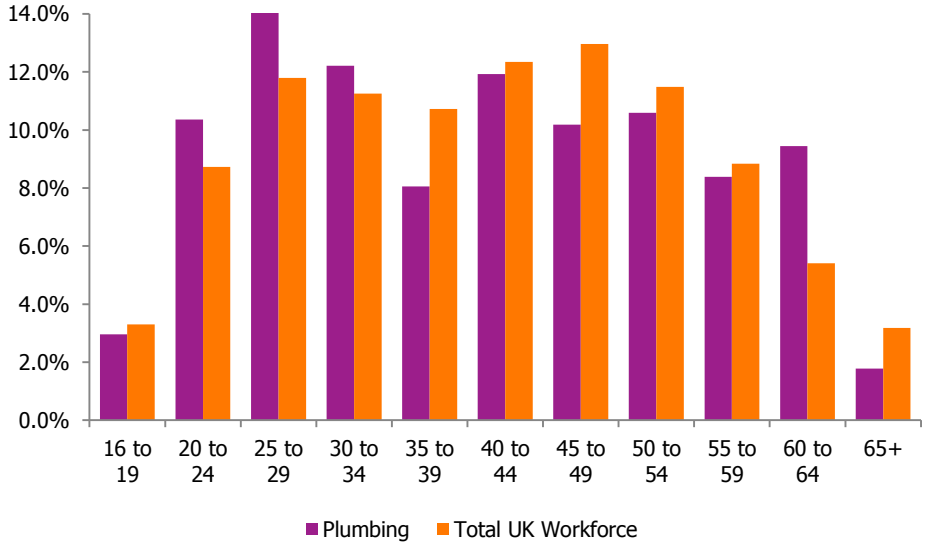
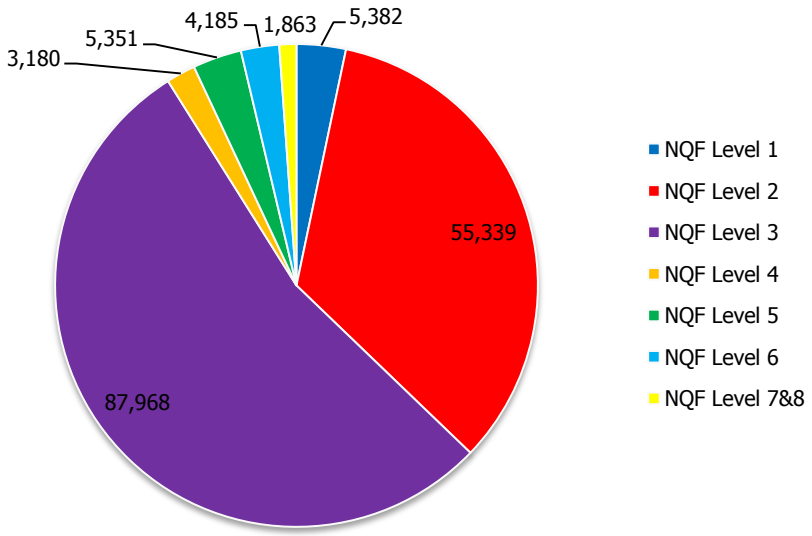
As was the case with Associate Engineering Technicians, Laboratory Technicians are mainly based in the South East, London and the East of England. There are also similar concentrations in the North West and South Yorkshire.

The key differences are strong concentrations in Devon, Wrexham, Cardiff, Falkirk, Edinburgh, Newcastle upon Tyne and Hull.

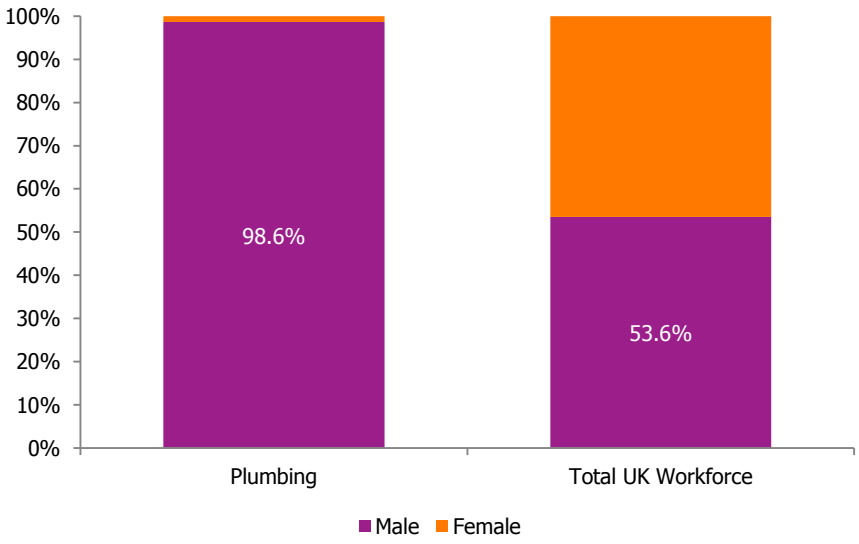
How much do they earn?	In terms of mean gross weekly salary, Laboratory Technicians tend to earn less than the national average (£444 compared to £461). In terms of median salary, they tend to earn slightly more.



5.5 Plumbing

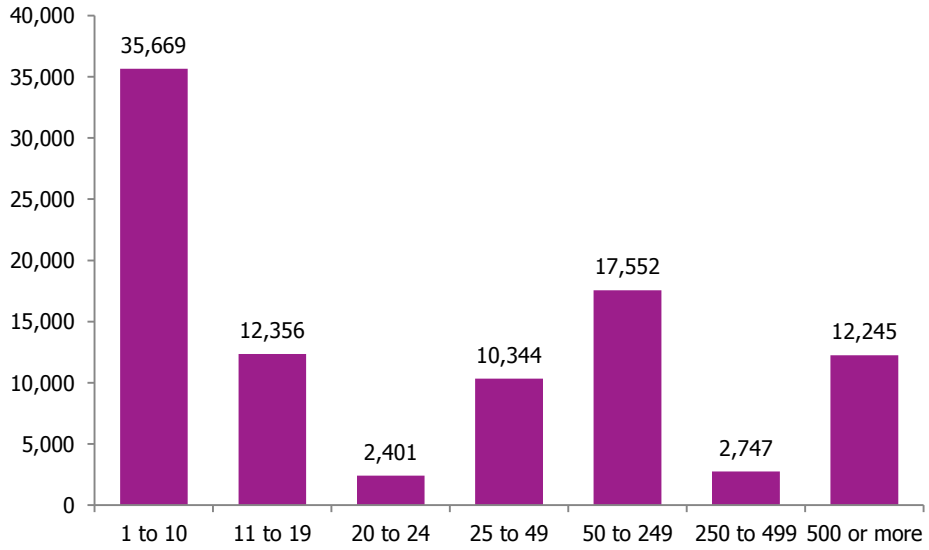
Plumbing (SOCs 5225, 5314)	
How many are there?	177,760 people are employed as Plumbers, or in related fields, across the UK.
Who are they?	They tend to be fairly well dispersed throughout each age category, in line with the UK workforce, with the exception of the 60 to 64 age bracket which has nearly twice the proportion of people employed in plumbing (9.4%) compared to the total UK workforce (5.4%).  The majority of Plumbers possess, as their highest qualification, a level 3 (54%) or level 2 (34%) qualification. 

There is a considerable gender bias towards men with only 1.4% of Plumbers being female.

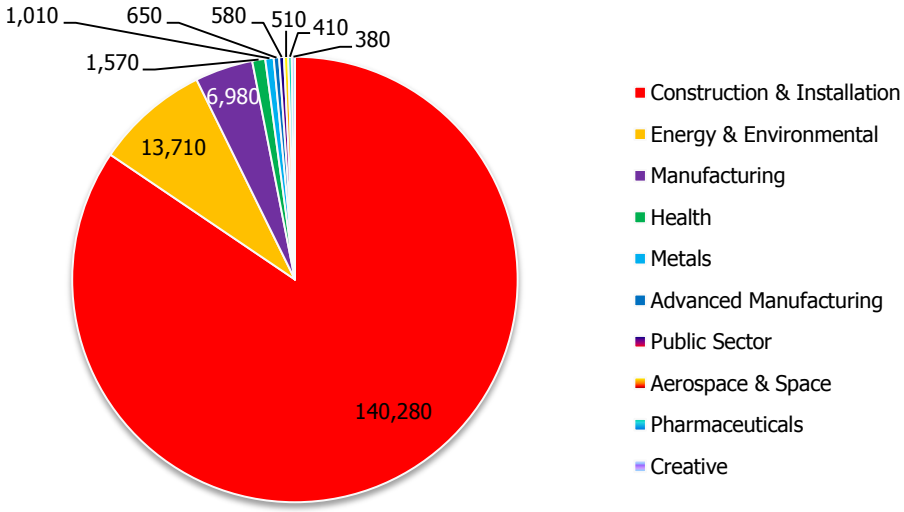


Who employs them?

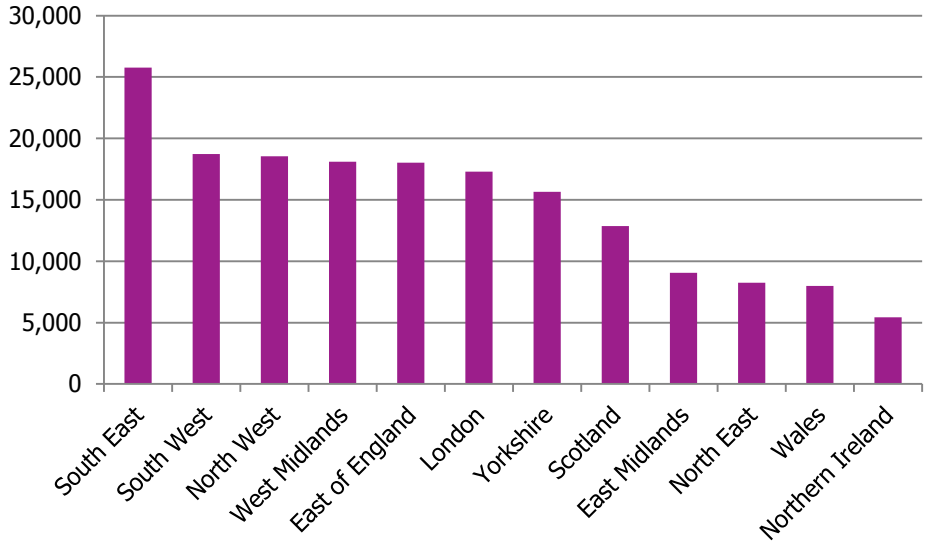
Plumbers are most likely to be employed in small businesses with 1 to 10 employees, accounting for over 35,000 individuals.



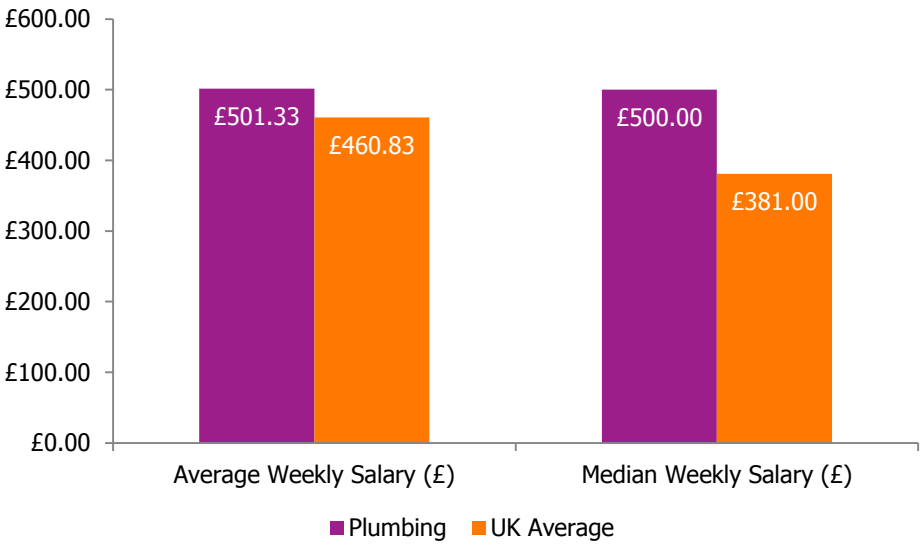
The top 10 employing sectors for Plumbers represent 93% of the workforce and the vast majority (79%) are employed in the Construction and Installation sector. The Energy and Environment and Manufacturing sectors account for less than 14,000 and less than 7,000 respectively. By comparison, the remaining sectors are underrepresented with only hundreds of plumbers employed in each.



Plumbers are most prevalent within the South East of England, with over 25,000 workers being based in this region. There is a relatively even distribution of Plumbers amongst the remaining regions of England, with each holding over 15,000 workers. The exception is the East Midlands and the North East, which have fewer than 10,000 Plumbers in their respective areas, similar to that of Wales and Northern Ireland.



How much do they earn?	Plumbers tend to command a higher weekly salary (gross) than the UK average in terms of mean and median salaries.



6. Appendix

6.1 STEM Role and Discipline definitions

This section highlights the Standard Occupational Classification (SOC) codes used to define each of the four STEM roles as well as the STEM Discipline that the SOC has been assigned to.

Table 13: SOCs used to define Manager roles and their discipline

SOC 2010	SOC10 Description	Total Emp	Emp with STEM Qual	% STEM Qualified	Filtered?	Discipline
1122	Production managers and directors in construction	160,260	41,030	25.6%		Engineering
1123	Production managers and directors in mining and energy	15,440	5,280	34.2%		Engineering
1131	Financial managers and directors	232,390	29,000	12.5%	Y	Mathematics
1136	Information technology and telecommunications directors	59,200	25,730	43.5%		Technology
1150	Financial institution managers and directors	97,490	8,620	8.8%	Y	Mathematics
1181	Health services and public health managers and directors	46,700	5,040	10.8%	Y	Health
1211	Managers and proprietors in agriculture and horticulture	20,200	2,550	12.6%	Y	Engineering
1213	Managers and proprietors in forestry, fishing and related services	12,460	*	*	Y	Engineering
1241	Health care practice managers	19,300	1,820	9.4%	Y	Health

Table 14: SOCs used to define Professional roles and their discipline

SOC 2010	SOC10 Description	Total Emp	Emp with STEM Qual	% STEM Qualified	Filtered?	Discipline
2111	Chemical scientists	23,650	15,360	65.0%		Science
2112	Biological scientists and biochemists	80,550	46,450	57.7%		Science
2113	Physical scientists	23,170	16,500	71.2%		Science
2114	Social and humanities scientists	13,570	2,700	19.9%	Y	Science
2119	Natural and social science professionals n.e.c.	41,620	22,480	54.0%		Science
2121	Civil engineers	68,530	42,410	61.9%		Engineering
2122	Mechanical engineers	87,700	38,360	43.7%		Engineering
2123	Electrical engineers	39,960	19,230	48.1%		Engineering
2124	Electronics engineers	35,700	15,470	43.3%		Engineering
2126	Design and development engineers	63,410	35,430	55.9%		Engineering
2127	Production and process engineers	45,820	23,070	50.3%		Engineering
2129	Engineering professionals n.e.c.	81,830	37,070	45.3%		Engineering
2133	IT specialist managers	178,560	61,860	34.6%		Technology
2134	IT project and programme managers	60,500	17,240	28.5%		Technology
2135	IT business analysts, architects and systems designers	106,800	41,750	39.1%		Technology
2136	Programmers and software development professionals	243,530	120,380	49.4%		Technology
2137	Web design and development professionals	65,710	16,880	25.7%		Technology
2139	Information technology and telecoms professionals n.e.c.	162,760	57,560	35.4%		Technology
2141	Conservation professionals	13,850	9,740	70.3%		Science
2142	Environment professionals	32,030	21,250	66.3%		Science
2150	Research and development managers	42,000	18,530	44.1%		Science
2211	Medical practitioners	241,460	17,400	7.2%		Health
2212	Psychologists	36,080	29,190	80.9%		Health
2213	Pharmacists	47,910	3,270	6.8%		Health
2214	Ophthalmic opticians	23,420	*	*		Health
2215	Dental practitioners	38,410	*	*		Health
2216	Veterinarians	16,510	11,340	68.7%		Health
2217	Medical radiographers	29,470	1,570	5.3%		Health
2218	Podiatrists	9,940	*	*		Health

SOC 2010	SOC10 Description	Total Emp	Emp with STEM Qual	% STEM Qualified	Filtered?	Discipline
2219	Health professionals n.e.c.	44,230	7,430	16.8%		Health
2221	Physiotherapists	49,940	3,240	6.5%		Health
2222	Occupational therapists	33,570	2,430	7.2%		Health
2223	Speech and language therapists	13,940	2,540	18.2%		Health
2229	Therapy professionals n.e.c.	37,980	9,580	25.2%		Health
2231	Nurses	585,300	18,460	3.2%	Y	Health
2232	Midwives	38,710	*	*	Y	Health
2421	Chartered and certified accountants	174,330	21,400	12.3%	Y	Mathematics
2423	Management consultants and business analysts	166,020	39,780	24.0%	Y	Mathematics
2425	Actuaries, economists and statisticians	35,310	17,240	48.8%		Mathematics
2426	Business and related research professionals	35,000	9,350	26.7%	Y	Technology
2431	Architects	54,440	33,160	60.9%		Engineering
2432	Town planning officers	18,970	13,370	70.5%		Engineering
2433	Quantity surveyors	35,150	18,940	53.9%		Engineering
2434	Chartered surveyors	60,630	26,250	43.3%		Engineering
2435	Chartered architectural technologists	3,890	2,360	60.6%		Engineering
2436	Construction project managers and related professionals	59,930	22,910	38.2%		Engineering
2461	Quality control and planning engineers	27,830	7,720	27.7%		Engineering
2463	Environmental health professionals	10,490	2,370	22.6%		Engineering

Table 15: SOCs used to define Associate Professional roles and their discipline

SOC 2010	SOC10 Description	Total Emp	Emp with STEM Qual	% STEM Qualified	Filtered?	Discipline
3111	Laboratory technicians	73,500	23,140	31.5%		Science
3112	Electrical and electronics technicians	22,210	7,470	33.6%		Engineering
3113	Engineering technicians	84,950	26,870	31.6%		Engineering
3114	Building and civil engineering technicians	18,130	4,720	26.0%		Engineering
3115	Quality assurance technicians	25,080	6,460	25.8%		Engineering
3116	Planning, process and production technicians	27,950	6,700	24.0%		Engineering
3119	Science, engineering and production technicians n.e.c.	39,660	10,250	25.8%		Science
3121	Architectural and town planning technicians	16,480	8,870	53.9%		Engineering
3122	Draughtspersons	40,660	11,930	29.4%		Engineering
3131	IT operations technicians	104,800	28,330	27.0%		Technology
3132	IT user support technicians	91,300	19,860	21.8%		Technology
3213	Paramedics	23,330	*	*		Health
3216	Dispensing opticians	5,020	*	*		Health
3217	Pharmaceutical technicians	27,220	1,940	7.1%		Health
3218	Medical and dental technicians	34,050	3,580	10.5%		Health
3219	Health associate professionals n.e.c.	47,410	5,050	10.7%	Y	Health
3531	Estimators, valuers and assessors	69,000	11,630	16.9%	Y	Mathematics
3532	Brokers	47,100	3,400	7.2%	Y	Mathematics
3533	Insurance underwriters	30,240	1,990	6.6%	Y	Mathematics
3534	Finance and investment analysts and advisers	176,680	21,200	12.0%	Y	Mathematics
3535	Taxation experts	34,560	3,210	9.3%	Y	Mathematics
3537	Financial and accounting technicians	28,020	2,150	7.7%	Y	Mathematics
3538	Financial accounts managers	118,590	11,680	9.8%	Y	Mathematics
3550	Conservation and environmental associate professionals	7,990	3,340	41.8%		Mathematics
3565	Inspectors of standards and regulations	45,700	12,770	27.9%		Engineering

Table 16: SOCs used to define Skilled Worker roles and their discipline

SOC 2010	SOC10 Description	Total Emp	Emp with STEM Qual	% STEM Qualified	Filtered?	Discipline
3417	Photographers, audio-visual and broadcasting equipment operators	77,620	8,390	10.8%	Y[14]	Technology
3421	Graphic designers	82,070	2,870	3.5%		Technology
3422	Product, clothing and related designers	61,520	3,750	6.1%	Y[15]	Technology
4121	Credit controllers	38,670	*	*	Y	Mathematics
4122	Book-keepers, payroll managers and wages clerks	390,860	30,400	7.8%	Y	Mathematics
4124	Finance officers	37,920	3,410	9.0%	Y	Mathematics
4129	Financial administrative occupations n.e.c.	149,200	7,400	5.0%	Y	Mathematics
5111	Farmers	120,400	5,730	4.8%	Y	Science
5112	Horticultural trades	14,980	*	*	Y	Science
5119	Agricultural and fishing trades n.e.c.	15,930	*	*	Y	Engineering
5211	Smiths and forge workers	5,590	*	*		Engineering
5212	Moulders, core makers and die casters	2,010	*	*		Engineering
5213	Sheet metal workers	17,740	*	*		Engineering
5214	Metal plate workers, and riveters	8,260	*	*		Engineering
5215	Welding trades	58,230	3,380	5.8%		Engineering
5216	Pipe fitters	10,380	*	*		Engineering
5221	Metal machining setters and setter-operators	59,720	4,220	7.1%		Engineering
5222	Tool makers, tool fitters and markers-out	12,940	1,860	14.4%		Engineering
5223	Metal working production and maintenance fitters	185,150	27,380	14.8%		Engineering
5224	Precision instrument makers and repairers	21,590	3,530	16.3%		Engineering
5225	Air-conditioning and refrigeration engineers	13,690	1,960	14.3%		Engineering
5241	Electricians and electrical fitters	227,890	41,290	18.1%		Engineering
5242	Telecommunications engineers	52,400	4,600	8.8%		Engineering
5244	TV, video and audio engineers	13,160	1,840	14.0%		Engineering
5245	IT engineers	35,340	8,600	24.3%		Engineering
5249	Electrical and electronic trades n.e.c.	70,540	14,410	20.4%		Engineering
5250	Skilled metal, electrical and electronic trades supervisors	38,400	7,420	19.3%		Engineering
5314	Plumbers and heating and ventilating engineers	164,070	15,940	9.7%		Engineering
6131	Veterinary nurses	14,210	2,150	15.1%		Health
6139	Animal care services occupations n.e.c.	50,140	2,670	5.3%		Health
6141	Nursing auxiliaries and assistants	299,000	9,510	3.2%	Y	Health
6142	Ambulance staff (excluding paramedics)	17,570	*	*	Y	Health
6143	Dental nurses	44,860	*	*		Health
8111	Food, drink and tobacco process operatives	122,640	2,650	2.2%	Y	Science
8114	Chemical and related process operatives	40,390	3,140	7.8%	Y	Science
8115	Rubber process operatives	6,260	*	*	Y	Science
8116	Plastics process operatives	35,320	*	*	Y	Science
8124	Energy plant operatives	5,300	*	*	Y	Engineering
8131	Assemblers (electrical and electronic products)	33,480	*	*	Y	Engineering
8132	Assemblers (vehicles and metal goods)	39,970	*	*	Y	Engineering
8133	Routine inspectors and testers	64,770	4,150	6.4%	Y	Engineering
9111	Farm workers	58,650	1,630	2.8%	Y	Science
9112	Forestry workers	10,350	*	*	Y	Science

Please note across all tables information has been suppressed with an asterisk (*) to signify where there is a low sample size, within the Annual Population Survey from which all the data is acquired.

[14] Rather than filtering on STEM qualifications, this SOC was filtered to exclude commercial photography (SIC 74.20)
[15] Rather than filtering on STEM qualifications, this SOC was filtered to exclude Fashion & Textile designers (SIC 13)

6.2 Sectoral Definitions

The following table provides details on the Standard Industrial Classification (SIC) codes used to define the bespoke sectors used in this report.

Table 17: SICs used to define bespoke sectors

SIC 2007	Description	Sector
26110	Manufacture of electronic components	Advanced Manufacturing
26120	Manufacture of loaded electronic boards	Advanced Manufacturing
26200	Manufacture of computers and peripheral equipment	Advanced Manufacturing
26301	Manufacture of telegraph, and telephone apparatus and equipment	Advanced Manufacturing
26301	Manufacture of telegraph and telephone apparatus and equipment	Advanced Manufacturing
26309	Manufacture of communication equipment other than telegraph, and telephone apparatus and equipment	Advanced Manufacturing
26400	Manufacture of consumer electronics	Advanced Manufacturing
26511	Manufacture of electronic instruments and appliances for measuring, testing, and navigation, except industrial process control equipment	Advanced Manufacturing
26512	Manufacture of electronic industrial process control equipment	Advanced Manufacturing
26513	Manufacture of non-electronic instruments and appliances for measuring, checking, testing, navigation and other purposes, except process control equipment	Advanced Manufacturing
26514	Manufacture of non-electronic industrial process control equipment	Advanced Manufacturing
26701	Manufacture of optical precision instruments	Advanced Manufacturing
26702	Manufacture of photographic and cinematographic equipment	Advanced Manufacturing
27110	Manufacture of electric motors, generators and transformers	Advanced Manufacturing
27120	Manufacture of electricity distribution and control apparatus	Advanced Manufacturing
27200	Manufacture of batteries and accumulators	Advanced Manufacturing
27310	Manufacture of fibre optic cables	Advanced Manufacturing
29100	Manufacture of motor vehicles	Advanced Manufacturing
29310	Manufacture of electrical and electronic equipment for motor vehicles and their engines	Advanced Manufacturing
30110	Building of ships and floating structures	Advanced Manufacturing
30400	Manufacture of military fighting vehicles	Advanced Manufacturing
30910	Manufacture of motorcycles	Advanced Manufacturing
33130	Repair of electronic and optical equipment	Advanced Manufacturing
30300	Manufacture of air and spacecraft and related machinery	Aerospace & Space
33160	Repair and maintenance of aircraft and spacecraft	Aerospace & Space
51101	Scheduled passenger air transport	Aerospace & Space
51102	Non-scheduled passenger air transport	Aerospace & Space
51210	Freight air transport	Aerospace & Space
51220	Space transport	Aerospace & Space
61300	Satellite telecommunications activities	Aerospace & Space
01110	Growing of cereals (except rice), leguminous crops and oil seeds	Agriculture/Horticulture
01120	Growing of rice	Agriculture/Horticulture
01130	Growing of vegetables and melons, roots and tubers	Agriculture/Horticulture
01140	Growing of sugar cane	Agriculture/Horticulture
01150	Growing of tobacco	Agriculture/Horticulture
01160	Growing of fibre crops	Agriculture/Horticulture
01190	Growing of other non-perennial crops	Agriculture/Horticulture
01210	Growing of grapes	Agriculture/Horticulture
01220	Growing of tropical and subtropical fruits	Agriculture/Horticulture
01230	Growing of citrus fruits	Agriculture/Horticulture
01240	Growing of pome fruits and stone fruits	Agriculture/Horticulture
01250	Growing of other tree and bush fruits and nuts	Agriculture/Horticulture
01260	Growing of oleaginous fruits	Agriculture/Horticulture
01270	Growing of beverage crops	Agriculture/Horticulture

SIC 2007	Description	Sector
01280	Growing of spices, aromatic, drug and pharmaceutical crops	Agriculture/Horticulture
01290	Growing of other perennial crops	Agriculture/Horticulture
01300	Plant propagation	Agriculture/Horticulture
01410	Raising of dairy cattle	Agriculture/Horticulture
01420	Raising of other cattle and buffaloes	Agriculture/Horticulture
01430	Raising of horses and other equines	Agriculture/Horticulture
01440	Raising of camels and camelids	Agriculture/Horticulture
01450	Raising of sheep and goats	Agriculture/Horticulture
01460	Raising of swine/pigs	Agriculture/Horticulture
01470	Raising of poultry	Agriculture/Horticulture
01490	Raising of other animals	Agriculture/Horticulture
01500	Mixed farming	Agriculture/Horticulture
01610	Support activities for crop production	Agriculture/Horticulture
01621	Farm animal boarding and care	Agriculture/Horticulture
01629	Other support activities for animal production	Agriculture/Horticulture
01629	Support activities for animal production (other than farm animal boarding and care) n.e.c.	Agriculture/Horticulture
01630	Post-harvest crop activities	Agriculture/Horticulture
01640	Seed processing for propagation	Agriculture/Horticulture
01700	Hunting, trapping and related service activities	Agriculture/Horticulture
02100	Silviculture and other forestry activities	Agriculture/Horticulture
02200	Logging	Agriculture/Horticulture
02300	Gathering of wild growing non-wood products	Agriculture/Horticulture
02400	Support services to forestry	Agriculture/Horticulture
03110	Marine fishing	Agriculture/Horticulture
03120	Freshwater fishing	Agriculture/Horticulture
03210	Marine aquaculture	Agriculture/Horticulture
03220	Freshwater aquaculture	Agriculture/Horticulture
46610	Wholesale of agricultural machinery, equipment and supplies	Agriculture/Horticulture
47760	Retail sale of flowers, plants, seeds, fertilizers, pet animals and pet food in specialised stores	Agriculture/Horticulture
64201	Activities of agricultural holding companies	Agriculture/Horticulture
74901	Environmental consulting activities	Agriculture/Horticulture
75000	Veterinary activities	Agriculture/Horticulture
77310	Renting and leasing of agricultural machinery and equipment	Agriculture/Horticulture
81300	Landscape service activities	Agriculture/Horticulture
91040	Botanical and zoological gardens and nature reserves activities	Agriculture/Horticulture
93191	Activities of racehorse owners	Agriculture/Horticulture
20110	Manufacture of industrial gases	Chemicals
20120	Manufacture of dyes and pigments	Chemicals
20130	Manufacture of other inorganic basic chemicals	Chemicals
20140	Manufacture of other organic basic chemicals	Chemicals
20150	Manufacture of fertilizers and nitrogen compounds	Chemicals
20160	Manufacture of plastics in primary forms	Chemicals
20170	Manufacture of synthetic rubber in primary forms	Chemicals
20200	Manufacture of pesticides and other agrochemical products	Chemicals
20301	Manufacture of paints, varnishes and similar coatings, mastics and sealants	Chemicals
20302	Manufacture of printing ink	Chemicals
20411	Manufacture of soap and detergents	Chemicals
20412	Manufacture of cleaning and polishing preparations	Chemicals
20420	Manufacture of perfumes and toilet preparations	Chemicals
20510	Manufacture of explosives	Chemicals
20520	Manufacture of glues	Chemicals

SIC 2007	Description	Sector
20530	Manufacture of essential oils	Chemicals
20590	Manufacture of other chemical products n.e.c.	Chemicals
22230	Manufacture of builders' ware of plastic	Construction & Installation
23610	Manufacture of concrete products for construction purposes	Construction & Installation
23620	Manufacture of plaster products for construction purposes	Construction & Installation
23630	Manufacture of ready-mixed concrete	Construction & Installation
23650	Manufacture of fibre cement	Construction & Installation
23690	Manufacture of other articles of concrete, plaster and cement	Construction & Installation
41100	Development of building projects	Construction & Installation
41201	Construction of commercial buildings	Construction & Installation
41202	Construction of domestic buildings	Construction & Installation
42110	Construction of roads and motorways	Construction & Installation
42120	Construction of railways and underground railways	Construction & Installation
42130	Construction of bridges and tunnels	Construction & Installation
42210	Construction of utility projects for fluids	Construction & Installation
42220	Construction of utility projects for electricity and telecommunications	Construction & Installation
42910	Construction of water projects	Construction & Installation
42990	Construction of other civil engineering projects n.e.c.	Construction & Installation
43110	Demolition	Construction & Installation
43120	Site preparation	Construction & Installation
43210	Electrical installation	Construction & Installation
43220	Plumbing, heat and air-conditioning installation	Construction & Installation
43290	Other construction installation	Construction & Installation
43310	Plastering	Construction & Installation
43320	Joinery installation	Construction & Installation
43330	Floor and wall covering	Construction & Installation
43341	Painting	Construction & Installation
43342	Glazing	Construction & Installation
43390	Other building completion and finishing	Construction & Installation
43910	Roofing activities	Construction & Installation
43991	Scaffold erection	Construction & Installation
43999	Other specialised construction activities n.e.c.	Construction & Installation
58110	Book publishing	Creative
58120	Publishing of directories and mailing lists	Creative
58130	Publishing of newspapers	Creative
58141	Publishing of learned journals	Creative
58142	Publishing of consumer and business journals and periodicals	Creative
58190	Other publishing activities	Creative
58210	Publishing of computer games	Creative
58290	Other software publishing	Creative
59111	Motion picture production activities	Creative
59112	Video production activities	Creative
59113	Television programme production activities	Creative
59120	Motion picture, video and television programme post-production activities	Creative
59131	Motion picture distribution activities	Creative
59132	Video distribution activities	Creative
59133	Television programme distribution activities	Creative
59140	Motion picture projection activities	Creative
59200	Sound recording and music publishing activities	Creative
60100	Radio broadcasting	Creative
60200	Television programming and broadcasting activities	Creative

SIC 2007	Description	Sector
62011	Ready-made interactive leisure and entertainment software development	Creative
62012	Business and domestic software development	Creative
62020	Computer consultancy activities	Creative
62020	Information technology consultancy activities	Creative
70210	Public relations and communications activities	Creative
71111	Architectural activities	Creative
71112	Urban planning and landscape architectural activities	Creative
73110	Advertising agencies	Creative
73120	Media representation services	Creative
74100	specialised design activities	Creative
74201	Portrait photographic activities	Creative
74202	Other specialist photography (not including portrait photography)	Creative
74202	Other specialist photography	Creative
74203	Film processing	Creative
74209	Photographic activities not elsewhere classified	Creative
74300	Translation and interpretation activities	Creative
85520	Cultural education	Creative
90010	Performing arts	Creative
90020	Support activities to performing arts	Creative
90030	Artistic creation	Creative
90040	Operation of arts facilities	Creative
91011	Library activities	Creative
91012	Archives activities	Creative
91020	Museums activities	Creative
91030	Operation of historical sites and buildings and similar visitor attractions	Creative
05101	Deep coal mines	Energy & Environmental
05102	Open cast coal working	Energy & Environmental
06100	Extraction of crude petroleum	Energy & Environmental
06200	Extraction of natural gas	Energy & Environmental
09100	Support activities for petroleum and natural gas mining	Energy & Environmental
19201	Mineral oil refining	Energy & Environmental
19209	Other treatment of petroleum products (excluding petrochemicals manufacture)	Energy & Environmental
24460	Processing of nuclear fuel	Energy & Environmental
35110	Production of electricity	Energy & Environmental
35120	Transmission of electricity	Energy & Environmental
35130	Distribution of electricity	Energy & Environmental
35140	Trade of electricity	Energy & Environmental
35210	Manufacture of gas	Energy & Environmental
35220	Distribution of gaseous fuels through mains	Energy & Environmental
35230	Trade of gas through mains	Energy & Environmental
35300	Steam and air conditioning supply	Energy & Environmental
36000	Water collection, treatment and supply	Energy & Environmental
37000	Sewerage	Energy & Environmental
38110	Collection of non-hazardous waste	Energy & Environmental
38120	Collection of hazardous waste	Energy & Environmental
38210	Treatment and disposal of non-hazardous waste	Energy & Environmental
38220	Treatment and disposal of hazardous waste	Energy & Environmental
38310	Dismantling of wrecks	Energy & Environmental
38320	Recovery of sorted materials	Energy & Environmental
39000	Remediation activities and other waste management services	Energy & Environmental
43130	Test drilling and boring	Energy & Environmental

SIC 2007	Description	Sector
64110	Central banking	Finance
64191	Banks	Finance
64192	Building societies	Finance
64301	Activities of investment trusts	Finance
64302	Activities of unit trusts	Finance
64303	Activities of venture and development capital companies	Finance
64304	Activities of open-ended investment companies	Finance
64305	Activities of property unit trusts	Finance
64306	Activities of real estate investment trusts	Finance
64910	Financial leasing	Finance
64921	Credit granting by non-deposit taking finance houses and other specialist consumer credit grantors	Finance
64922	Activities of mortgage finance companies	Finance
64929	Other credit granting n.e.c.	Finance
64991	Security dealing on own account	Finance
64992	Factoring	Finance
64999	Financial intermediation not elsewhere classified	Finance
65110	Life insurance	Finance
65120	Non-life insurance	Finance
65201	Life reinsurance	Finance
65202	Non-life reinsurance	Finance
65300	Pension funding	Finance
66110	Administration of financial markets	Finance
66120	Security and commodity contracts dealing activities	Finance
66190	Activities auxiliary to financial intermediation n.e.c.	Finance
66210	Risk and damage evaluation	Finance
66220	Activities of insurance agents and brokers	Finance
66290	Other activities auxiliary to insurance and pension funding	Finance
66300	Fund management activities	Finance
10110	Processing and preserving of meat	Food & Drink
10120	Processing and preserving of poultry meat	Food & Drink
10130	Production of meat and poultry meat products	Food & Drink
10200	Processing and preserving of fish, crustaceans and molluscs	Food & Drink
10310	Processing and preserving of potatoes	Food & Drink
10320	Manufacture of fruit and vegetable juice	Food & Drink
10390	Other processing and preserving of fruit and vegetables	Food & Drink
10390	Processing and preserving of fruit and vegetables n.e.c.	Food & Drink
10410	Manufacture of oils and fats	Food & Drink
10420	Manufacture of margarine and similar edible fats	Food & Drink
10511	Liqid milk and cream production	Food & Drink
10512	Butter and cheese production	Food & Drink
10519	Manufacture of other milk products	Food & Drink
10520	Manufacture of ice cream	Food & Drink
10611	Grain milling	Food & Drink
10612	Manufacture of breakfast cereals and cereals-based food	Food & Drink
10620	Manufacture of starches and starch products	Food & Drink
10710	Manufacture of bread; manufacture of fresh pastry goods and cakes	Food & Drink
10720	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	Food & Drink
10730	Manufacture of macaroni, noodles, couscous and similar farinaceous products	Food & Drink
10810	Manufacture of sugar	Food & Drink
10821	Manufacture of cocoa and chocolate confectionery	Food & Drink
10822	Manufacture of sugar confectionery	Food & Drink

SIC 2007	Description	Sector
10831	Tea processing	Food & Drink
10832	Production of coffee and coffee substitutes	Food & Drink
10840	Manufacture of condiments and seasonings	Food & Drink
10850	Manufacture of prepared meals and dishes	Food & Drink
10860	Manufacture of homogenized food preparations and dietetic food	Food & Drink
10890	Manufacture of other food products n.e.c.	Food & Drink
10910	Manufacture of prepared feeds for farm animals	Food & Drink
10920	Manufacture of prepared pet foods	Food & Drink
11010	Distilling, rectifying and blending of spirits	Food & Drink
11020	Manufacture of wine from grape	Food & Drink
11030	Manufacture of cider and other fruit wines	Food & Drink
11040	Manufacture of other non-distilled fermented beverages	Food & Drink
11050	Manufacture of beer	Food & Drink
11060	Manufacture of malt	Food & Drink
11070	Manufacture of soft drinks; production of mineral waters and other bottled waters	Food & Drink
82920	Packaging activities	Food & Drink
26600	Manufacture of irradiation, electromedical and electrotherapeutic equipment	Health
32500	Manufacture of medical and dental instruments and supplies	Health
86101	Hospital activities	Health
86102	Medical nursing home activities	Health
86210	General medical practice activities	Health
86220	Specialists medical practice activities	Health
86230	Dental practice activities	Health
86900	Other human health activities	Health
61100	Wired telecommunications activities	ICT
61200	Wireless telecommunications activities	ICT
61900	Other telecommunications activities	ICT
62030	Computer facilities management activities	ICT
62090	Other information technology and computer service activities	ICT
62090	Other information technology service activities	ICT
63110	Data processing, hosting and related activities	ICT
63120	Web portals	ICT
63990	Other information service activities n.e.c.	ICT
52101	Operation of warehousing and storage facilities for water transport activities of division 50	Logistics
52102	Operation of warehousing and storage facilities for air transport activities of division 51	Logistics
52103	Operation of warehousing and storage facilities for land transport activities of division 49	Logistics
52211	Operation of rail freight terminals	Logistics
52212	Operation of rail passenger facilities at railway stations	Logistics
52213	Operation of bus and coach passenger facilities at bus and coach stations	Logistics
52219	Other service activities incidental to land transportation	Logistics
52219	Other service activities incidental to land transportation, n.e.c.	Logistics
52220	Service activities incidental to water transportation	Logistics
52230	Service activities incidental to air transportation	Logistics
52241	Cargo handling for water transport activities of division 50	Logistics
52242	Cargo handling for air transport activities of division 51	Logistics
52243	Cargo handling for land transport activities of division 49	Logistics
52290	Other transportation support activities	Logistics
53100	Postal activities under universal service obligation	Logistics
53201	Other postal and courier activities: Licensed carriers	Logistics
53202	Other postal and courier activities: Unlicensed carriers	Logistics
12000	Manufacture of tobacco products	Manufacturing

SIC 2007	Description	Sector
16100	Sawmilling and planing of wood	Manufacturing
16210	Manufacture of veneer sheets and wood-based panels	Manufacturing
16220	Manufacture of assembled parquet floors	Manufacturing
16230	Manufacture of other builders' carpentry and joinery	Manufacturing
16240	Manufacture of wooden containers	Manufacturing
16290	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	Manufacturing
17110	Manufacture of pulp	Manufacturing
17120	Manufacture of paper and paperboard	Manufacturing
17211	Manufacture of corrugated paper and paperboard, sacks and bags	Manufacturing
17219	Manufacture of other paper and paperboard containers	Manufacturing
17220	Manufacture of houseold and sanitary goods and of toilet requisites	Manufacturing
17220	Manufacture of household and sanitary goods and of toilet requisites	Manufacturing
17230	Manufacture of paper stationery	Manufacturing
17240	Manufacture of wallpaper	Manufacturing
17290	Manufacture of other articles of paper and paperboard n.e.c.	Manufacturing
18110	Printing of newspapers	Manufacturing
18121	Manufacture of printed labels	Manufacturing
18129	Printing n.e.c.	Manufacturing
18130	Pre-press and pre-media services	Manufacturing
18140	Binding and related services	Manufacturing
18201	Reproduction of sound recording	Manufacturing
18202	Reproduction of video recording	Manufacturing
18203	Reproduction of computer media	Manufacturing
22110	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	Manufacturing
22190	Manufacture of other rubber products	Manufacturing
22210	Manufacture of plastic plates, sheets, tubes and profiles	Manufacturing
22220	Manufacture of plastic packing goods	Manufacturing
22290	Manufacture of other plastic products	Manufacturing
23110	Manufacture of flat glass	Manufacturing
23120	Shaping and processing of flat glass	Manufacturing
23130	Manufacture of hollow glass	Manufacturing
23140	Manufacture of glass fibres	Manufacturing
23190	Manufacture and processing of other glass, including technical glassware	Manufacturing
23200	Manufacture of refractory products	Manufacturing
23310	Manufacture of ceramic tiles and flags	Manufacturing
23320	Manufacture of bricks, tiles and construction products, in baked clay	Manufacturing
23410	Manufacture of ceramic household and ornamental articles	Manufacturing
23420	Manufacture of ceramic sanitary fixtures	Manufacturing
23430	Manufacture of ceramic insulators and insulating fittings	Manufacturing
23440	Manufacture of other technical ceramic products	Manufacturing
23490	Manufacture of other ceramic products n.e.c.	Manufacturing
23510	Manufacture of cement	Manufacturing
23520	Manufacture of lime and plaster	Manufacturing
23700	Cutting, shaping and finishing of stone	Manufacturing
23910	Production of abrasive products	Manufacturing
23990	Manufacture of other non-metallic mineral products n.e.c.	Manufacturing
25110	Manufacture of metal structures and parts of structures	Manufacturing
25120	Manufacture of doors and windows of metal	Manufacturing
25210	Manufacture of central heating radiators and boilers	Manufacturing
25290	Manufacture of other tanks, reservoirs and containers of metal	Manufacturing
25300	Manufacture of steam generators, except central heating hot water boilers	Manufacturing

SIC 2007	Description	Sector
25500	Forging, pressing, stamping and roll-forming of metal; powder metallurgy	Manufacturing
25610	Treatment and coating of metals	Manufacturing
25620	Machining	Manufacturing
25710	Manufacture of cutlery	Manufacturing
25720	Manufacture of locks and hinges	Manufacturing
25730	Manufacture of tools	Manufacturing
25910	Manufacture of steel drums and similar containers	Manufacturing
25920	Manufacture of light metal packaging	Manufacturing
25930	Manufacture of wire products, chain and springs	Manufacturing
25940	Manufacture of fasteners and screw machine products	Manufacturing
25990	Manufacture of other fabricated metal products n.e.c.	Manufacturing
26520	Manufacture of watches and clocks	Manufacturing
26800	Manufacture of magnetic and optical media	Manufacturing
27320	Manufacture of other electronic and electric wires and cables	Manufacturing
27330	Manufacture of wiring devices	Manufacturing
27400	Manufacture of electric lighting equipment	Manufacturing
27510	Manufacture of electric domestic appliances	Manufacturing
27520	Manufacture of non-electric domestic appliances	Manufacturing
27900	Manufacture of other electrical equipment	Manufacturing
28110	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	Manufacturing
28120	Manufacture of fluid power equipment	Manufacturing
28131	Manufacture of pumps	Manufacturing
28132	Manufacture of compressors	Manufacturing
28140	Manufacture of taps and valves	Manufacturing
28150	Manufacture of bearings, gears, gearing and driving elements	Manufacturing
28210	Manufacture of ovens, furnaces and furnace burners	Manufacturing
28220	Manufacture of lifting and handling equipment	Manufacturing
28230	Manufacture of office machinery and equipment (except computers and peripheral equipment)	Manufacturing
28240	Manufacture of power-driven hand tools	Manufacturing
28250	Manufacture of non-domestic cooling and ventilation equipment	Manufacturing
28290	Manufacture of other general-purpose machinery n.e.c.	Manufacturing
28301	Manufacture of agricultural tractors	Manufacturing
28302	Manufacture of agricultural and forestry machinery other than tractors	Manufacturing
28410	Manufacture of metal forming machinery	Manufacturing
28490	Manufacture of other machine tools n.e.c.	Manufacturing
28490	Manufacture of other machine tools	Manufacturing
28910	Manufacture of machinery for metallurgy	Manufacturing
28921	Manufacture of machinery for mining	Manufacturing
28922	Manufacture of earthmoving equipment	Manufacturing
28923	Manufacture of equipment for concrete crushing and screening and roadworks	Manufacturing
28930	Manufacture of machinery for food, beverage and tobacco processing	Manufacturing
28940	Manufacture of machinery for textile, apparel and leather production	Manufacturing
28950	Manufacture of machinery for paper and paperboard production	Manufacturing
28960	Manufacture of plastics and rubber machinery	Manufacturing
28990	Manufacture of other special-purpose machinery n.e.c.	Manufacturing
28990	Manufacture of other special purpose machinery n.e.c.	Manufacturing
29201	Manufacture of bodies (coachwork) for motor vehicles (except caravans)	Manufacturing
29202	Manufacture of trailers and semi-trailers	Manufacturing
29203	Manufacture of caravans	Manufacturing
29320	Manufacture of other parts and accessories for motor vehicles and their engines	Manufacturing
29320	Manufacture of other parts and accessories for motor vehicles	Manufacturing

SIC 2007	Description	Sector
30120	Building of pleasure and sporting boats	Manufacturing
30200	Manufacture of railway locomotives and rolling stock	Manufacturing
30920	Manufacture of bicycles and invalid carriages	Manufacturing
30990	Manufacture of other transport equipment n.e.c.	Manufacturing
31010	Manufacture of office and shop furniture	Manufacturing
31020	Manufacture of kitchen furniture	Manufacturing
31030	Manufacture of mattresses	Manufacturing
31090	Manufacture of other furniture	Manufacturing
32110	Striking of coins	Manufacturing
32120	Manufacture of jewellery and related articles	Manufacturing
32130	Manufacture of imitation jewellery and related articles	Manufacturing
32200	Manufacture of musical instruments	Manufacturing
32300	Manufacture of sports goods	Manufacturing
32401	Manufacture of professional and arcade games and toys	Manufacturing
32409	Manufacture of other games and toys, n.e.c.	Manufacturing
32910	Manufacture of brooms and brushes	Manufacturing
32990	Other manufacturing n.e.c.	Manufacturing
33120	Repair of machinery	Manufacturing
33140	Repair of electrical equipment	Manufacturing
33150	Repair and maintenance of ships and boats	Manufacturing
33170	Repair and maintenance of other transport equipment n.e.c.	Manufacturing
33170	Repair and maintenance of other transport equipment	Manufacturing
33190	Repair of other equipment	Manufacturing
33200	Installation of industrial machinery and equipment	Manufacturing
45111	Sale of new cars and light motor vehicles	Manufacturing
45112	Sale of used cars and light motor vehicles	Manufacturing
45190	Sale of other new motor vehicles	Manufacturing
45190	Sale of other used motor vehicles	Manufacturing
45200	Maintenance and repair of motor vehicles	Manufacturing
45310	Wholesale trade of motor vehicle parts and accessories	Manufacturing
45320	Retail trade of motor vehicle parts and accessories	Manufacturing
45400	Sale, maintenance and repair of motorcycles and related parts and accessories	Manufacturing
24100	Manufacture of basic iron and steel and of ferro-alloys	Metals
24200	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	Metals
24310	Cold drawing of bars	Metals
24320	Cold rolling of narrow strip	Metals
24330	Cold forming or folding	Metals
24340	Cold drawing of wire	Metals
24410	Precious metals production	Metals
24420	Aluminium production	Metals
24430	Lead, zinc and tin production	Metals
24440	Copper production	Metals
24450	Other non-ferrous metal production	Metals
24510	Casting of iron	Metals
24520	Casting of steel	Metals
24530	Casting of light metals	Metals
24540	Casting of other non-ferrous metals	Metals
33110	Repair of fabricated metal products	Metals
33110	Repair of fabricated metal prodects	Metals
25400	Manufacture of weapons and ammunition	Military
84220	Defence activities	Military

SIC 2007	Description	Sector
07290	Mining of other non-ferrous metal ores	Mining & Quarrying
08110	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	Mining & Quarrying
08120	Operation of gravel and sand pits; mining of clays and kaolin	Mining & Quarrying
08910	Mining of chemical and fertilizer minerals	Mining & Quarrying
08930	Extraction of salt	Mining & Quarrying
08990	Other mining and quarrying n.e.c.	Mining & Quarrying
09900	Support activities for other mining and quarrying	Mining & Quarrying
21100	Manufacture of basic pharmaceutical products	Pharmaceuticals
21200	Manufacture of pharmaceutical preparations	Pharmaceuticals
84110	General public administration activities	Public Sector
84120	Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security	Public Sector
84130	Regulation of and contribution to more efficient operation of businesses	Public Sector
84210	Foreign affairs	Public Sector
84230	Justice and judicial activities	Public Sector
84240	Public order and safety activities	Public Sector
84250	Fire service activities	Public Sector
84300	Compulsory social security activities	Public Sector
71200	Technical testing and analysis	Research & Development
72110	Research and experimental development on biotechnology	Research & Development
72190	Other research and experimental development on natural sciences and engineering	Research & Development
72200	Research and experimental development on social sciences and humanities	Research & Development
73200	Market research and public opinion polling	Research & Development
74902	Quantity surveying activities	Research & Development
74909	Other professional, scientific and technical activities n.e.c.	Research & Development
85310	General secondary education	Secondary Schools
85320	Technical and vocational secondary education	Tertiary Education in including FE
85410	Post-secondary non-tertiary education	Tertiary Education in including FE
85421	First-degree level highrt education	Tertiary Education in including FE
85422	Post-graduate level higher education	Tertiary Education in including FE
13100	Preparation and spinning of textile fibres	Textiles
13200	Weaving of textiles	Textiles
13300	Finishing of textiles	Textiles
13910	Manufacture of knitted and crocheted fabrics	Textiles
13921	Manufacture of soft furnishings	Textiles
13922	manufacture of canvas goods, sacks, etc.	Textiles
13923	manufacture of household textiles	Textiles
13931	Manufacture of woven or tufted carpets and rugs	Textiles
13939	Manufacture of other carpets and rugs	Textiles
13940	Manufacture of cordage, rope, twine and netting	Textiles
13950	Manufacture of non-wovens and articles made from non-wovens, except apparel	Textiles
13960	Manufacture of other technical and industrial textiles	Textiles
13990	Manufacture of other textiles n.e.c.	Textiles
14110	Manufacture of leather clothes	Textiles
14120	Manufacture of workwear	Textiles
14131	Manufacture of other men's outerwear	Textiles
14132	Manufacture of other women's outerwear	Textiles
14141	Manufacture of men's underwear	Textiles
14142	Manufacture of women's underwear	Textiles

SIC 2007	Description	Sector
14190	Manufacture of other wearing apparel and accessories n.e.c.	Textiles
14200	Manufacture of articles of fur	Textiles
14310	Manufacture of knitted and crocheted hosiery	Textiles
14390	Manufacture of other knitted and crocheted apparel	Textiles
15110	Tanning and dressing of leather; dressing and dyeing of fur	Textiles
15120	Manufacture of luggage, handbags and the like, saddlery and harness	Textiles
15200	Manufacture of footwear	Textiles
20600	Manufacture of man-made fibres	Textiles
49100	Passenger rail transport, interurban	Transport
49200	Freight rail transport	Transport
49311	Urban and suburban passenger railway transportion by underground, metro and similar systems	Transport
49319	Other urban, suburban or metropolitan area passenger land transport (not incl. underground, metro and the like)	Transport
49320	Taxi operation	Transport
49390	Other passenger land transport	Transport
49410	Freight transport by road	Transport
49420	Removal services	Transport
49500	Transport via pipeline	Transport
50100	Sea and coastal passenger water transport	Transport
50200	Sea and coastal freight water transport	Transport
50300	Inland passenger water transport	Transport
50400	Inland freight water transport	Transport

Industries not covered above are categorised as '*Other Industries*' within the analysis.