

# The current and future UK science workforce

For The Science Council

EXECUTIVE SUMMARY





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Prepared by TBR's Skills and Labour Market Team

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## Executive Summary

Since 2004 the Science Council has operated the Chartered Scientist register (CSci), which recognises high levels of professionalism and competence in science. CSci is open to scientists with a masters-level qualification or equivalent. This research was commissioned by the Science Council to support the exploration of the potential market for new registers in science and thereby provide professional recognition for those who are not practising at the level of Chartered Scientist.

The objectives of this research were to explore the potential for expanding registration to technician and intermediate levels by developing comprehensive data on the current UK science workforce, understanding the profile of employment across the skills levels and providing a view on the future workforce and where demand is likely to be the highest.

## Methodology

This research uses a new analysis considering the science workforce across the entire economy, rather than looking at total employees within science based industries. This innovative approach enables an understanding of the true size and scope of the science workforce across the economy, rather than limiting the research to considering scientists working in a narrow band of science sectors.

The definitions of the science workforce used for this report are:

- Primary science workers: workers in occupations that are purely science based and require the consistent application of scientific knowledge and skills in order to execute the role effectively.
- Secondary science workers: workers in occupations that are science related and require a mixed application of scientific knowledge and skills alongside other skill sets, which are often of greater importance to executing the role effectively.
- Non-science workers: workers in occupations that are not science based and have no requirement for science based knowledge or skills.

Sectors are also classified as:

- Core science sectors: sectors that are primarily science based in their core activity.
- Related science sectors: sectors in which the primary activity is not necessarily science based, but has a strong relationship to science.
- Non-science sectors: sectors which have no science based or related activity.

## The current UK science workforce

There are 5.8m people employed in science based occupations (1.2m primary science workers and 4.6m secondary science workers). This equates to 20% of the UK workforce employed in science roles. This 'permeation' of science workers across the economy means that this employment distribution is very similar to total economy averages.

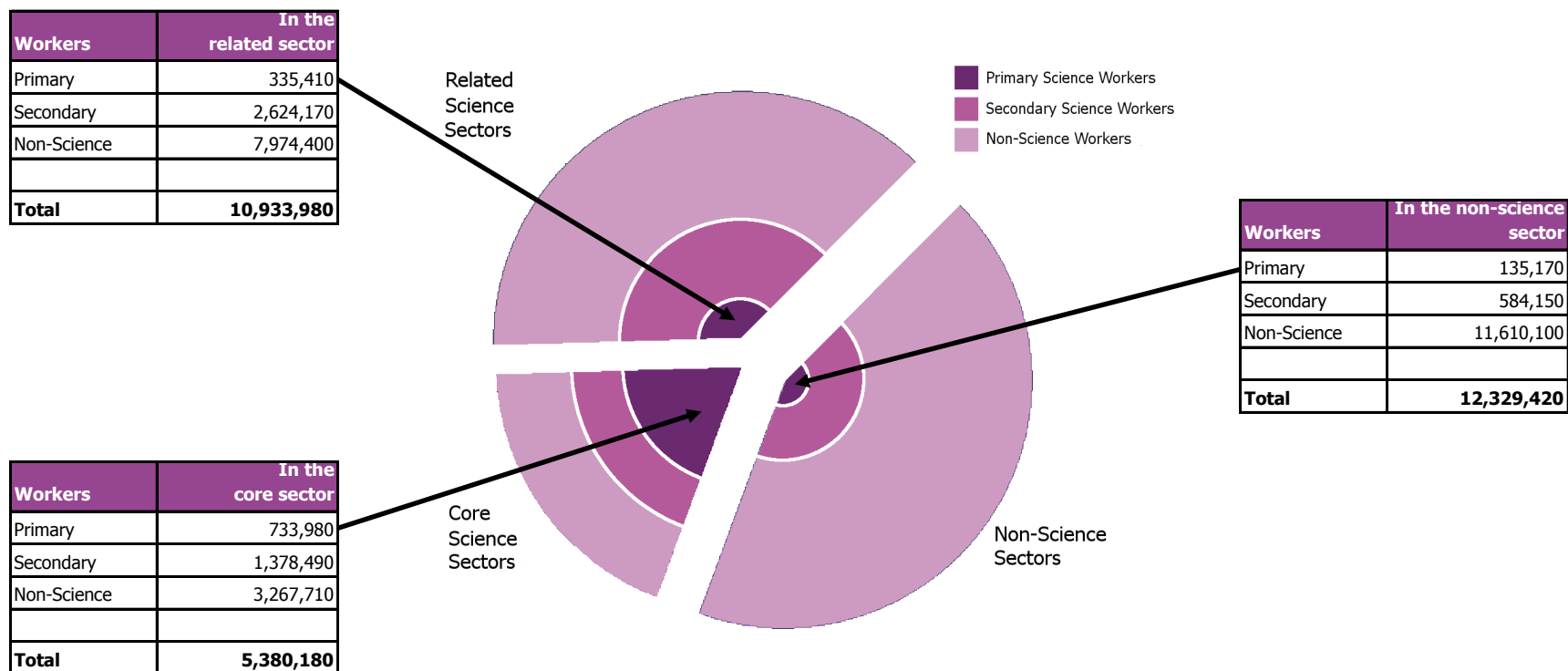
- Of the science workforce: 37.4% (2.1m) is located in the East, the South East and London. In comparison, 36.7% of the entire UK economy workforce is located in these regions. The North West, Scotland and the South West are notable employment locations outside of the South Eastern 'hub' for the science workforce.

The Health and Education sectors employ 60% of the science workforce and the remaining 40% of the science workforce is distributed across a range of sectors.

Primary science occupations make up the largest share of the workforce in the Research & Development, Secondary science occupations make up the largest share of the workforce in the Education, ICT, Health and Consultancy sectors.

The diagram below provides an overview of the distribution of the science workforce across the economy, showing the number of people employed in core, related and non-science sectors and the distribution of employment within these sectors provided by primary, secondary and non-science workers.

The core science sector employs approximately 5.4m workers, of which 734k are in primary science roles. However, there are an additional 470K primary workers employed in related and non-science sectors.



### **The qualification profile of the science workforce**

A much higher proportion of employees in science based roles (compared to the non-science and the all economy average) are qualified to post-graduate level (25%).

Education, Research & Development and Consultancy all have a much higher than average proportion of the science workforce qualified to post-graduate level. These sectors also tend to have a relatively high proportion of the workforce qualified to graduate level, but low proportions at non-graduate and with unknown or other qualifications.

Advanced manufacturing, Energy & Environmental, Construction & Installation, Manufacturing, Metals and Rubber and Plastics all show high levels of non-graduate employment (in each sector greater than 55% of the science workforce is qualified at this level).

ICT has the highest proportion of science workers whose highest qualification is at graduate level (47%), followed by Consultancy, the Public Sector and Professional Organisations.

### **Workforce characteristics**

Overall, the primary science workforce has a gender balance of 60/40 (male/female). This is similar to the UK working population, which is 54/46 (male/female). Only the Health sector has more female science workers than male and only a few sectors are close to a 50/50 distribution between female and male workers. A number of sub-sectors have much higher proportions of male employees than female employees including:

- Manufacturing where 96% of employees are male.
- Construction & Installation and Military where 94% of employees are male.
- ICT where 91% of employees are male.

This varies slightly when considering the secondary science workforce. A higher proportion of women take up secondary science roles, with the gender balance being 44% male and 56% female. There are some interesting nuances by sector including:

- A far greater proportion of women work in secondary science roles compared to primary science roles in Textiles, Health, Pharmaceuticals and Education.
- A far smaller proportion of women work in secondary science roles in Agriculture & Aquaculture
- The gender balance in Metals is virtually identical in both primary and secondary science occupations.

Though the overall gender balance is similar for science workers, in science based sectors, there is an extreme difference in the gender balance for science based workers in non-science sectors. There are just over 720k core and secondary science workers employed in non-science sectors, of which 73% are male and 27% are female. This suggests that there is a strong bias towards employing men in science roles where the core activity of the organisation is not science based.

### Age

The primary workforce is slightly younger than the secondary science workforce, with an average age of 41 compared to 43. Whilst a high proportion of both primary and secondary workers tend to be aged between 35 and 54, a much greater proportion of primary workers are aged between 16 and 34 and a smaller proportion are aged over 55.

Food & Drink, Rubber & Plastics, Textiles and the Military employ the highest proportion of 16-24 year old science workers. In the 25-34 age group, ICT, the Military, Research & Development and Rubber & Plastics are all top employers. Agriculture & Aquaculture, Metals and Professional Organisations and Consultancy all employ an above average proportion of science workers in the over 65 age group.

If the typical graduate age is taken to be 21–22, the main sector in which science workers of this age group (16-24) are distinctly under represented is the Public Sector. Considering the first few years of graduate employment up to the age of perhaps 26-27, science workers of this age group (24-34) tend to be under represented to a greater extent in Agriculture & Aquaculture and Construction & Installation.

### Length of time in sector

The amount of time an individual has been working in their role is indicative of their employment choices and movement. Approximately 30% of the science workforce has been in their current role for between 1 and 5 years and 40% for between 6 and 20 years.

Research & Development has by far the largest proportion of science workers who have been in employed in their current position for less than 1 year. Agriculture & Aquaculture has the largest proportion of workers who have been in their current role for more than 20 years. The Textiles sector has a much higher than average proportion of the workforce remaining in the same position for between 6 and 20 years.

### Salary and wage

The variation in the average wage per hour earned by science workers alongside averages for primary science workers, secondary science workers and those employed in non-science roles in science based sectors has some interesting components:

- The highest paid primary science workers are employed in the Public Sector. The lowest paid work in the Textiles sector.
- The highest paid secondary science workers are employed in Education. The lowest paid work is again in the Textiles sector, closely followed by Agriculture & Aquaculture.
- In related science sectors, workers employed in secondary science roles earn more per hour than primary science workers.
- In ICT, the Military and to a lesser extent the Consultancy sectors, non-science workers earn more than primary science workers.
- There are more instances of non-science workers being paid above the science sector average wage for non-science workers, than there are primary or secondary science workers being paid above their respective science sector averages.
- The average science wages are generally higher than the average wage across the whole economy.

Science workers who are employed in non-science sectors are generally paid a lower average wage than their peers in science based sectors. However, the average wage for a primary science worker is not very dissimilar to that earned by a primary science worker in a core science sector.

### Workforce in the future

The UKCES 2010 National Strategic Skills Audit provides an insight into the growth areas of the economy, highlighting where new jobs are anticipated. The areas of the economy which are predicted to grow include the following, all of which are relevant to the core and/or related sectors detailed in this study:

- Advanced manufacturing
- Low carbon economy
- Digital economy
- Life sciences and pharmaceuticals
- Professional and financial services
- Engineering/construction

A number of studies and reports have been produced that investigate the future demand for STEM graduates. However, at the time of writing there are no specific forecasts available to provide occupational level data on the future science workforce. In the absence of forecasts, this research uses employment projections based on employment trends demonstrated in the last five years.

Projections show that if increases continue, 7.1m people will be employed in either a primary or secondary science role by 2030.

Between 2009 and 2030, the Core Science Sectors will grow by 301,180 workers. Of these new workers, 60% will be in Non Science Occupations (183k), 26% in secondary science workers (78k) and 14% in primary science occupations (42k).

Between 2009 and 2030, the Related Science Sectors will grow by 620,740 workers. Of these new workers, 73% will be in Non Science Occupations (453k), 24% in secondary science workers (149k) and 3% in primary science occupations (18k).