

DIUS: Analysis on Demand for STEM skills**Response by the Wellcome Trust**

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1. The Wellcome Trust is the largest charity in the UK. It funds innovative biomedical research, in the UK and internationally, spending over £600 million each year to support the brightest scientists with the best ideas. The Wellcome Trust supports public debate about biomedical research and its impact on health and wellbeing.
2. The Trust welcomes DIUS' fresh look at Science, Technology, Engineering and Maths (STEM) skills demand. Discussions about current or potential shortage of STEM graduates have mainly centred around anecdotal evidence or observation. The Trust considers it important for DIUS to build a stronger evidence base for policies that will affect STEM skills demand and supply. Our response sets out some key messages when considering skills demand analysis, and highlights some recent reports and ongoing work that could contribute to this area of debate.
3. Estimating the UK's requirements for STEM skills will be challenging. Previous skills demand analyses such as the Department for Children, Schools and Families (DCSF) Teacher Supply Model to estimate demands for teachers, and that undertaken by the Department of Health (DOH) to predict the demand for doctors demonstrate how difficult it is to accurately gauge demand even with a tightly-defined workforce.
4. There are several dimensions to STEM skills demand, and different analysis indicators would be required to measure each of these factors, which include:
 - a. Quantity of STEM skilled people required
 - b. Quality and level of STEM skills required
 - c. STEM literacy in the wider workforce and the need for STEM skills in non STEM-focused careers.
5. When estimating future UK STEM skills demand and supply, it will be important to consider other significant factors such as the changing sector composition of the economy, declining undergraduate numbers until 2020¹, and implementation of the Bologna process that aims to increase the mobility of students and researchers within the European Union. The deliberate recruitment of highly skilled professionals from outside the European Economic Area² must also be taken into account.
6. Despite the inherent complexity of such an analysis, it should be possible to develop a useful picture of skills demand by taking an economy wide overview, and supplementing this with assessment of specific skill needs in defined sectors where appropriate and achievable (see below). The white paper *Innovation Nation* sets out an economic strategy largely predicated on STEM, so future STEM skills demand as a whole is unlikely to decrease.

¹ Government Actuaries Department projections: http://www.gad.gov.uk/Demography_Data/Population/

² The UK Border Agency: <http://ukba.homeoffice.gov.uk/workingintheuk/tier1/general/>.

7. In order to meet demand for high-quality STEM skills, PhD science training must remain an attractive option to the brightest students. In the Trust study, *The Supervisor's Perspective*³, almost half of supervisors surveyed felt that it was more difficult to recruit PhD students than it had been five years previously. The main reasons given were that students considered a scientific career to be financially unattractive and long-term career prospects for PhD scientists to be poor. Equally, there is a duty on employers to ensure that they are making employment and progression opportunities as attractive as possible.

Examples of sector-specific evidence for STEM skills demand

- *In vivo sciences in the UK: sustaining the supply of skills in the 21st century*⁴ (The Association of British Pharmaceutical Industries (ABPI)/Biosciences Federation 2007). The key finding is a quantified decline in the quality and quantity of skills in those sciences requiring *in vivo* practical experience and knowledge. The employer survey that informed this report is currently being reviewed and updated by the ABPI.
- *The Science, Technology, Engineering and Mathematics (STEM) programme report*⁵ (The Department for Education and Skills/Department for Trade and Industry 2006). The key finding is a concern about lack of Chemistry graduates pursuing careers in teaching.
- *Bioscience and Innovation 2015*⁶ (Department of Trade and Industry 2004). Conclusions and recommendations related to STEM skills demand are below.
 - A successful bioscience sector will require: biologists skilled at engineering to innovate in bioprocessing, physicians with the biological research experience to lead in tissue engineering, and computer scientists with doctorates in molecular biology to establish new frontiers in bioinformatics.
 - UK bioscience also needs a deep pool of managers skilled at both business and science. The development of such skills is not encouraged by the focus on research outcomes, encouraged by the RAE.
 - Recommendation to create a programme to fund combined Bachelor of Medicine Mb-PhD qualifications with 30 studentships at selected HEIs, rising to 100 in equilibrium, and introduction of a programme to fund post-PhD scientists and engineers undertaking formal business education,
- *Do we need more scientists?*⁷ (Michael Teitelbaum, 2003) An alternative perspective is presented in a paper published by the Sloan Foundation. Set in the context of the United States, it concludes that there is no evidence of STEM skills shortage.
- *Forthcoming study on career tracking*. The Trust is currently developing a study to track the careers over time of a number of cohorts of clinical and basic PhD grant holders who have received career support from Trust initiatives. The baseline information and subsequent career progress of the participants will therefore inform our understanding of the overall 'success' of the funding initiatives, and will also indicate where there is demand for the skills of these cohorts.

³ *The Supervisor's Perspective* (Wellcome Trust, 2001): <http://www.wellcome.ac.uk/About-us/Publications/Books/Biomedical-science/WTD003203.htm>

⁴ *In vivo sciences in the UK: sustaining the supply of skills in the 21st century* (ABPI/BSF, 2007): http://www.abpi.org.uk/publications/pdfs/invivo_brochure.pdf

⁵ *The Science, Technology, Engineering and Mathematics (STEM) programme report* (DFES/DTI, 2004): <http://www.dcsf.gov.uk/hegateway/uploads/STEM%20Programme%20Report.pdf>

⁶ *Bioscience and Innovation 2015* (DTI, 2004): <http://www.bioindustry.org/bigtreport/index2.html>

⁷ *Do we need more scientists?* (Michael Teitelbaum, 2003): <http://www.sloan.org/programs/documents/PublicInterestTeitelbaum2003.pdf>