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Current and Future Trends

1. A changing labour market

As the table below shows, the UK has changed from a predominantly manufacturing and agricultural-based economy to one that is increasingly service based:

	Manufacturing	Services
1950	9 million employees	9 million employees
1986	5.2 million employees	18 million employees
2006	3.3 million employees	25 million employees

One of the results of this is that the number of jobs in semi-skilled or unskilled work is declining. Employers are increasingly looking for people with higher level qualifications to fill clerical, technical and professional level work:

- In 1960, 8 million or 33% of the labour market was in unskilled or semi-skilled jobs.
- In 2006, 3.5 million or 12% of the labour market was in unskilled or semi-skilled jobs.
- In 2007, the Treasury forecast that by 2020 just 600,000 or 2% of the labour market would be in unskilled or semi-skilled jobs.

2. An ageing population

In the UK, the number of over 65s is predicted to increase from 8.5 million in 2000 to 12.3 million by 2025 and 15 million in 2050. This will place growing pressures on the health and medical services in particular. As a result, there will be increasing demand for people with STEM skills, with exciting opportunities in areas such as:

- *Biomedical engineering* – designing hip and knee replacement joints, heart bypass valves, breast implants
- *Bioinformatics and computational biology* – solving biological problems at a molecular level such as DNA sequencing in the treatment of cancer to target individual cells
- *Pharmaceutical research* – working to develop new drugs to combat the effects of cancer, tackling mental health issues, vaccines, insulin, antibiotics

- *Biotechnology* – using living cells (bacteria, yeast, stem cells) as well as biological substances (enzymes) in industrial processes like brewing and baking, and in research in agriculture and medicine.

3. A STEM skills shortage

The CBI Education and Skills Survey of 2010 states that 45% of employers are currently having difficulty recruiting STEM staff, rising to almost 59% expecting difficulty in the next three years. **Almost one third of businesses are anticipating difficulty recruiting STEM graduates.**

The UK Commission for Employment and Skills – Working Futures 2007–2017 predicts an **increased demands for skilled technicians and association professionals** of 654,000 over the period 2007 to 2017. In its audit of Skills for Jobs¹ it reports the growing importance of technicians, especially in specialist STEM areas. A Cogent (Sector Skills Council) Report in 2008 similarly concluded that the current inflow of non-graduates is insufficient to meet replacement demand in processing and technician roles. This deficit will increase significantly in the period to 2017, which coincides with the known lowest point in 16 – 18 year olds in the general population. Matthew Harrison, Director, Education Programmes, Royal Academy of Engineering has pointed out that “*With our society evermore dependent on technology, we rely increasingly on the technicians who install and maintain the nation’s technological infrastructure. Yet the contribution made by these people who can match knowledge of science with real practical skills goes unsung*”

1. Skills for Jobs: Today and Tomorrow 2010



Examples of growth areas for STEM opportunities include:

- *Nanotechnology* – the science of the very small enabling the development of light and immensely strong materials with varied applications including telecommunications, aviation, fuel cells
- *Space technology* – developing satellites for use in, for example, telecommunications, global positioning systems, military surveillance
- *Civil and water engineering* – needed to design and construct, for example, flood defences, improved irrigation systems, dams, desalination plants
- *Ubicomp technology* – designing and building micro-processors and low cost sensors into, for example, central heating systems, refrigerators, and security systems to enable use by remote control.

4. Climate change

The Climate Change Act 2008 sets a 2050 target of reducing UK carbon emissions by 80% compared to 1990 levels. The report calls for a whole range of measures including:

- carbon capture and storage
- a new generation of nuclear energy
- greater energy efficiency
- renewable sources of energy
- a second generation of biodiesel fuels

To meet the challenge of climate change, there is a need to boost the number of people with STEM skills at all levels in order to achieve these targets and meet the demand for skills that these technologies will create in areas including:

- *Renewable energy technology* – generating electricity from renewable sources such as wind, solar and tidal power
- *Clean coal technology* – building new coal-fired power stations where carbon emissions are reduced and stored underground
- *Nuclear engineering* – needed for the programme of decommissioning old plants and building new nuclear power stations over the next decades
- *Fuel cell technology* – fuel cells combine hydrogen and oxygen to produce water, electricity and heat – a potential alternative energy source that is cleaner and more efficient than using non-renewable fossil fuels.

The International Perspective

The economic growth of the BRIC nations (Brazil, Russia, India and China) is challenging a two hundred year dominance by Europe and the USA. Predictions are that the Chinese economy will overtake the US economy by around 2025 and be twice as big in terms of Gross Domestic Product, by 2050¹

China and India are the two most heavily populated countries in the world, with a combined total in 2008 of 2.4 billion people out of 6.6 billion (adding up to 36% of the total world population). These two countries with their large domestic markets will increasingly dominate the world economy.

For the UK to meet this global economic challenge, there is an ever greater need for people with STEM skills. “A strong supply of people with science, technology, engineering and maths skills is important to promote innovation, exploit new technologies, produce world class scientists and for the UK to compete internationally.”²

1. *BRICs and Beyond* – Goldman Sachs Global Economic Department – November 2007

2. *Educating the next generation of scientists* DfE November 2010

