The Open University

STEM Skills

Current impacts, future trends & possible solutions

What's the issue?

British business has achieved much in helping the nation's economy to recover. However, is the growing skills shortage - something that is already affecting workforce planning - threatening the UK's ability to compete and thrive? Key drivers such as globalisation of markets, shifting technologies and the abundance of data, means it's critical for organisations to have the right skills in place to respond.

Science, technology, engineering and mathematics (STEM) skills are a crucial part of this response for organisations across all sectors. Even public sector organisations and SMEs are feeling the pressure to adapt and keep up with market trends as they struggle to avert risks, such as missed opportunities, business delays and ineffective cyber security – highlighted by the high-profile cases seen in the news recently.

"Businesses…are already reporting major skills shortages, including in sectors critical to the rebalancing of the economy – and when it comes to filling skilled roles in the future, businesses are not confident they will be able to find sufficient recruits."

Confederation of British Industry (CBI), Education & Skills Survey, 2015

According to research carried out in 2015, by the UK Commission for Employment and Skills (UKCES)[1], 43% of vacancies in STEM roles are hard to fill due to a shortage of applicants with the required skills – almost double the UK average of 24%.

In the report, UKCES projected that there will be 2 million new jobs between now and 2020 that will demand higher STEM skills than in the past, which means organisations need to start preparing now for the jobs of the future, if they want to win the 'war' on talent.

But we'd be wrong to assume that it's just traditional manufacturing and engineering jobs that will need to be filled, STEM skills will increasingly be needed across a wide range of industries, presenting exciting opportunities for both organisations and individuals.

- Zoology
- Robotics
- Gaming
- Energy
- Sport
- Aerospace
- Emergency services
- Mobile app development
- Psychology
- Fashion
- Special Effects
- Toy design
- Music production
- Marketing
- 3D printing
- Data Science
- Pharming

[1] UKCES: Reviewing the requirement for high level STEM skills, Evidence Report 94, July 2015

Current impacts

British industry is being affected across the board, with the automotive, health, defence, construction and environmental industries particularly at risk. Currently, the shortage is causing a considerable impact on the automotive industry, as carmakers compete with their suppliers (and competitors) for skilled engineers.

Automotive

Jaguar Land Rover (JLR) launched a recruitment drive several years ago for thousands of engineers, designers and technicians to support its multi-million pound investment in an engine plant near Wolverhampton. However, today the company is still struggling to find skills to meet their needs. Not even the strength of the JLR brand and its position as the UK's second-largest carmaker has been enough to redress the skills gap issues.

IT

In September 2015, BT announced its plan to try to improve digital and technology skills, by becoming involved in two education initiatives, in an attempt to close the IT skills gap. BT Chief Executive, Gavin Patterson, explained in a recent article, "There won't only be more demand for specialist tech skills; many jobs, in different sectors, will require some level of tech literacy"[2], which is why one of these initiatives is aimed at primary school children.

Cyber Security

An article on STEM skills wouldn't be complete without mentioning cyber security. With so many high-profile cases in the news recently – most notably Talk-Talk – it's impossible to ignore the risks that skills gaps present for information security. According to the (ISC)[2] Global Workforce Survey, conducted by Frost & Sullivan, there will be a shortage of 1.5 million information security professionals by 2020[3]. This is something that organisations are struggling with now, as a lack of cyber security skills has been cited as a key reason for these recent data breaches

Commercial skills

In addition to the talent gap currently affecting employers, the CBI reports that the lack of STEM skills is not the only problem when recruiting; many businesses find that new applicants lack general workplace experience and are weak in commercial skills, such as strategic thinking, customer service and leadership and management. In fact, there are many cases where talented subject matter experts are promoted into managerial roles only for their commercial skills to be found wanting.

[2] Source: Clare McDonald. (2015). BT launches technology scholarships and primary schools IT skills programme. Available: www.computerweekly.com/news/4500253098/BT-launches-technology-scholarships-and-primary-schools-IT-skills-programme. Last accessed 15th February 2016.

[3] Source: Frost & Sullivan, The 2015 (ISC)[2] Global Information Security Workforce Study

Future trends

However, the outlook is not a completely bleak one, as organisations that are astute and innovative will seek ways to overcome these risks and transform them into opportunities. The recent Future of Work study, produced by the UK Commission for Employment and Skills (UKCES)[4], identified the 13 'most influential and plausible trends impacting the jobs and skills landscape' that will affect the UK over the next two decades. These include:

- Demographic changes
- Shifting economic perspectives
- New business ecosystems
- Growing scarcity of natural resources
- Economic growth in Asia

These fundamental trends are shaping the global economy, and the way we work, spanning areas as diverse as the digitisation of manufacturing, ICT development, the abundance of data and merging technologies (such as biology and technology) – all of which present huge opportunities for organisations.

[3] Source: UKCES, The Future of Work: Jobs and skills in 2030, February 2014

An agile response

In the UK we will see an increased need for cross-disciplinary skills, as well as changes to the working environment. Workforces will become more fluid and dispersed, as organisations shift towards a 24-hour pattern of working to help them operate more effectively on a global scale.

As a result, Britain is going to need highly skilled STEM professionals in the future, with an ability to not only understand these emergent technologies and data analysis techniques, but to also be able to use concepts drawn from a range of STEM subjects.

And let's not forget the creative industries – with technologies continuing to advance and converge at a rapid pace, product development in areas such as gaming, animation, special effects, textile design, digital marketing and broadcasting will also need to be underpinned by a higher level of cross-disciplinary skills.

Whether it's in the traditional STEM fields of manufacturing, engineering, medicine, biological sciences, IT or agriculture, or in the emergent fields of entertainment, media, fashion or sport, there is no denying that many business opportunities will arise as a result of these trends. The organisations that adapt within this evolving context will be the organisations that seize them.

"By 2022 there are projected to be an additional 2 million jobs in occupations that require higher level skills…with the total share increasing from 42 per cent to 46 per cent of all those in employment."

UK Commission for Employment and Skills (UKCES), Working Futures 2012-2022

Combining strengths to solve the issues

If fundamental business trends are creating a wealth of risks (and opportunities) within STEM industries, then what is the best way for employers to access the high level skills needed to develop new products and services?

According to the UKCES, in its Forging Futures report, "Collaborations between employers and universities have a significant role to play in providing the supply of highly skilled people to meet demand from businesses both now and in the future". There is no doubting that education and business collaboration can produce strong outcomes, but what are the options to employers?

Apprenticeship programmes

Apprenticeship programmes are an effective way to develop specialist STEM skills, representing a viable cost-effective, tailored way of building a talent pipeline within an organisation. Apprentices are usually eager to learn, having chosen to train in an industry they are interested in, and by progressing them onto higher-skilled programmes in the future, employers stand a better chance of reducing future skills-gap risks.

Business and university collaboration

Many organisations value having strong links with universities, as not only does it provide a stream of graduate recruitment with higher-level skills, it also contributes to business research and innovation, therefore increasing business competitiveness. The CBI echoed this recently, "Strengthening links between universities and businesses has great potential to enhance economic growth…to develop people with the right knowledge and skills to meet their future needs".[4]

As course content is delivered by academics who are experts in their fields – often with first-hand experience of working in these areas professionally – and learning content is focused on theory as well as practical application, universities are well placed to deliver high-level training that meets business needs.

> "Collaborations between employers and universities have a significant role to play in providing the supply of highly skilled people to meet demand from businesses both now and in the future."
>
> *UK Commission for Employment and Skills (UKCES), Forging Futures*

[4] CBI Education & Skills Survey 2015

Bespoke training pathways

One of the most effective ways to address skills gaps within organisations is to create bespoke training pathways. This approach enables employers to be actively involved in the design and delivery of programmes, ensuring that the training is tailored according to organisational needs. By ensuring relevant training pathways are in place, employers not only benefit from their own staff being trained but also from attracting new talent into their organisation keen to develop their careers.

"One way to address the skills challenge is by developing more partnership-based provision, with greater levels of business involvement in universities, as well as by boosting apprenticeships… at the same time, there is a pressing need to upskill and re-skill the existing workforce."

Confederation of British Industry (CBI), Best of Both Worlds: Guide to Business-University Collaboration, 2015

Explore further

UKCES Reviewing the Requirement for Higher Level STEM Skills

$(ISC)^2$ Global Workforce Survey, conducted by Frost & Sullivan

UKCES The Future of Work: Jobs and Skills in 2030

CBI: Education & Skills Survey, 2015

UKCES: The Supply of and Demand for High-Level STEM Skills