DIGITAL SKILLS IN GLOBAL BRITAIN

A perspective from
Imagination Technologies
April 21

Introduction

The UK is suffering a digital skills deficit that risks undermining its future prosperity. In the next decade, the UK could forgo up to £140 bn in economic growth from the missed opportunities in "intelligent technologies", such as artificial intelligence and automation, due to an outdated system of education and workplace training.[1] A recent survey of UK business leaders found that just 18 percent of leaders believe that school leavers and graduates have the right digital skills and experience. [2]

With technological change set to accelerate in the coming years, closing this digital skills gap has long been a priority. But the urgency to do so has been magnified further by the economic impact of the covid-19 pandemic. Changes in the way we live and work, with much more of our activity taking place in the digital sphere, will persist in some form post-crisis. And while much will look as it did before, the shape of our economy – in particular the jobs that sustain it and the skills these require – will undoubtedly be different. Investment in digital skills will be essential to seizing these opportunities while ensuring that the transition is as smooth as possible. Moreover, in an economy increasingly characterised by insecure and short-term employment, jobs based on in-demand digital skills promise greater job security and income growth. To fulfil its potential in the next phase of technological revolution, the UK must turn the page and emerge as a global digital skills leader.

1 https://www.accenture.com/gb-en/company-news-release-g20-report-uk
2 https://www2.deloitte.com/uk/en/pages/press-releases/articles/digital-skills-gap-narrows-but-still-persists-from-classroom-to-boardroom.html

At Imagination Technologies, we are committed to playing our part in securing the UK's future as a digital skills leader. However, as a leading British technology business, our success depends on sustained access to skilled talent. In this report we identify several skills challenges which we believe must be solved if the UK is to fulfil its potential in the digital economy of tomorrow. These include: a skills shortage in the technical and professional skills needed to power the knowledge economy; a lack of diversity across the tech sector and in tech education; and ongoing uncertainties around British firms' future access to international talent. We also explore the contribution Imagination is making to addressing these challenges, from working with schools and universities to introduce students to our technology, to offering work placements and apprenticeships across our company.

Better collaboration between government and private sector businesses like Imagination could help pinpoint bottlenecks and develop workable solutions. This report provides suggestions on what form these might take, including areas where Imagination and businesses in our supply chain are well placed to help. To fulfil its potential in the next phase of technological revolution, the UK must turn the page and emerge as a global digital skills leader.

Simon Beresford-Wylie,
Chief Executive,
Imagination Technologies

About Imagination Technologies

Founded in 1985 and headquartered in Hertfordshire, Imagination Technologies is a leading British technology business that develops highly advanced intellectual property (IP) for use in semiconductors. Our IP creates considerable value in the electronic systems value chain, ultimately improving the user experience in many different consumer electronic devices, including games consoles, mobile phones, cars and computers.

Our IP is licensed to some of the world's leading companies, and we look forward to significant growth in the coming years as technologies including artificial intelligence and autonomous vehicles increase demand for advanced IP. To prepare for that future we are investing heavily in research and development (R&D) and innovation, as demonstrated by our place among the top 10 UK businesses in terms of patents granted in 2019.

With over two-thirds of our global workforce - and the majority of our advanced R&D and skilled engineers - based in the UK, we have a real stake in ensuring the UK's future as a leading digital skills hub.

The UK skills ecosystem: unfulfilled potential

The digital skills deficit

It is well documented that the UK lacks the skills it needs to service the demands of an internationalised knowledge-based economy. It does not produce enough software engineers, data scientists and specialists in cutting-edge fields such as artificial intelligence, big data and the Internet of Things (IoT). Without further investment in digital skills, this is expected to cost the UK up to £140 bn over the next decade.

But in addition to the lack of so-called "hard skills", there are deficiencies in crucial "softer" skills including analytical thinking, complex problem-solving, creativity, financial literacy, teamwork, and management. The success of the UK's tech industry is dependent on everyone entering the workforce having the right blend of technical and professional skills to succeed.

From our experience, while universities do a relatively good job at producing tech talent, this is less true of other parts of the education system such as technical and vocational education. Despite the skills deficit, the UK has one of the largest funding gaps between academic and technical education, with technical students receiving 23% less funding than academic students. This is in contrast with several other developed countries, where the reverse is common.[3] Meanwhile, rates of adult education are at their lowest levels in 23 years and funding for adult education has fallen by more than 45% since 2009, perpetuating the poor access to lifelong learning opportunities that exists today.[4] To close the digital skills gap, greater investment and participation in technical and adult education must be a priority.

The rapidly changing nature of work itself makes solving this skills deficit even more important. An ageing society is reducing the size of the working-age population, just as the shift to remote working gives employers the flexibility and incentive to hire outside the UK when skills needs cannot be met domestically. We must act now to ensure that the UK has the skills base it needs to emerge as a leading player in the accelerating digital revolution.

3 https://epi.org.uk/publications-and-research/international-comparison-of-technical-education/

4 https://publications.parliament.uk/pa/cm5801/cmselect/cmeduc/278/27806.htm#_idTextAnchor007

Accessing the best global talent post-Brexit

Although Imagination aspires to attract and nurture home-grown digital talent, we are proud to welcome people from around the world to our business. As the UK sets out its new post-Brexit immigration regime, openness to highly skilled talent and administrative flexibility need to be central to the government's plans.

Imagination supports the government's inclusion of criteria in the points system that will facilitate the immigration of skilled workers who may not always meet salary thresholds, 'such as a "shortage occupation" or holding a PhD relevant to a job. The reintroduction of a pathway for international students to seek work after graduating is especially welcome as we look to retain the best international talent that has studied at our world class universities.

The government also needs to be aware of potential pitfalls. If the process of attracting skilled European workers is excessively onerous or costly, then the UK risks losing out as it competes for talent with EU member states continuing to partake in freedom of movement.

As the new immigration system beds in, the government must ensure that it acts as an enabler to the British economy's ability to attract the foreign talent it needs to succeed in the 21st century economy.
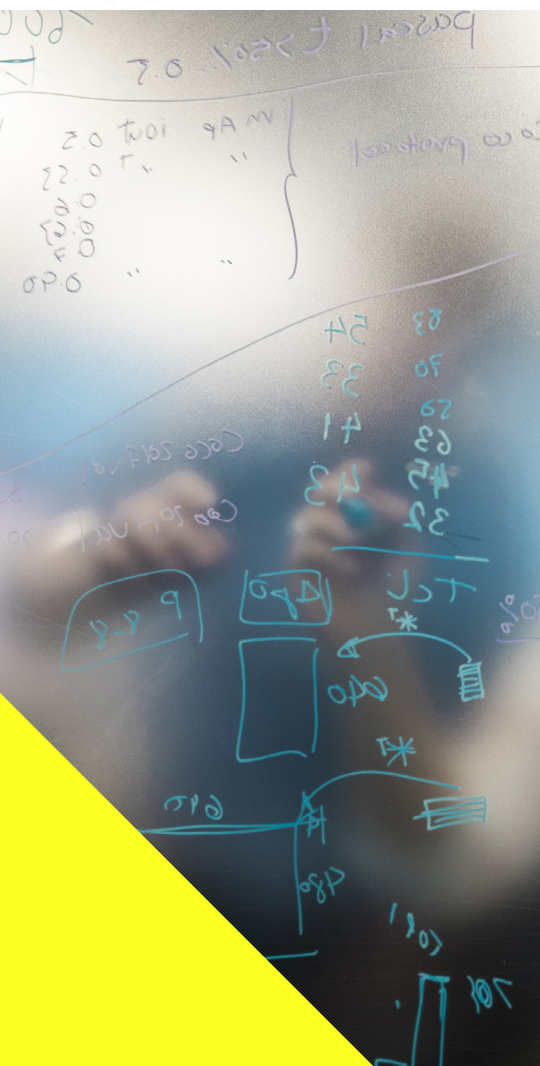
The diversity deficit

The underrepresentation of women, ethnic minorities and other groups not only restricts the UK talent pool that companies like Imagination are able to recruit from, but also results in less diverse decision-making in businesses themselves. According to the British Computer Society (BCS), while the share of female representation in the UK sector has been growing and is now 20%, this remains low in comparison to women's participation in the labour force generally (49%). The BCS finds that ethnic minorities are relatively well represented in tech overall, but not when it comes to leadership positions, with just 11% of directors having a minority background.

The lack of diversity in tech is a multifaceted problem with deep roots. These include a lack of visible role models working in tech from underrepresented groups, reinforcing the impression to women and minority groups that tech "isn't for them". Furthermore, exposure to tech as a realistic career path in the education system is highly uneven, with more traditional occupations continuing to receive greater attention. Cutting across these specific issues are under-lying inequalities in the distribution of opportunity in society which themselves need to be addressed.

There is no single "silver bullet" to address diversity challenges in tech, but concerted action by government and business in partnership could go a long way.

"For the UK to thrive in an ever changing and dynamic technical domain, we must do everything we can to support and train people from a wide community. Imagination Technologies' Digital Skills paper describes some of the issues that need to be addressed. One area that needs balancing is diversity in tech industries. If we can rebalance the diversity deficit then the products and services produced can be positively influenced and this will make for better products and services for everyone."

Darren McKie, Lecturer in Computer Science – University of Hull

Imagination's role in the UK's skills ecosystem

As a leading British technology business, Imagination is committed to playing its part in supporting the UK's digital skills ecosystem. Through our recruitment and training, work with schools and universities, and work placements and apprenticeships, we help develop the UK's existing tech talent and encourage the development of digital skills in future generations.

Partnering with universities

In addition to recruiting directly from UK universities, we also believe the UK must produce more STEM graduates than it currently does, particularly in computing and engineering. Through our Imagination University Programme (IUP), we seek to contribute to addressing this shortfall. Through the IUP, students receive a theoretical and practical introduction to our leading-edge technologies, equipping them with valuable skills, exposing them to new career paths, and making them more attractive to technology firms after graduation. For several years we have been providing teachers with teaching materials, hardware and software for use in their classes and labs.

While the IUP is a global programme, we currently work with UK universities including the University of Bath, the University of Bristol, the University of Cambridge, Cardiff University, Coventry University, the University of Hertfordshire, the University of Hull, Imperial College London, the University of Leeds, the University of Manchester, Sheffield Hallam University, Staffordshire University, the University of Southampton and the University of Warwick. In fact, well over half of our investment in the Imagination University Programme is spent in the UK.

Case study:

Darren McKie,
Lecturer at the University of Hull

Darren McKie is a lecturer at the University of Hull's Department of Computer Science and Technology. He is a fellow of the Higher Education Academy, and leads activities at the university focussed on teaching excellence.

The University of Hull has adapted rapidly to a completely online model of teaching since September 2020, and pioneered new ways of ensuring that remote students are kept fully engaged. This has included enabling lecturers to supervise their students in real-time during practical exercises, fostering a supportive atmosphere that comes close to replicating the environment of real-world physical labs.

McKie was commissioned by the Imagination University Programme to create teaching materials based on Imagination's Graphics Processors Units (GPUs) and programming tools, helping students to master the creation of moving graphic images on a mobile device. His materials, which underpin a semester-long course, are provided to teachers around the world and are actively supported through online forums. They enable teachers to include current, real-world, production-level technology in their courses, motivate and excite students, and demonstrate the UK's leadership in global education.

According to McKie, "designing graphics for mobile devices is challenging but essential, as more and more content is consumed through smartphones and tablets. Students must understand the complexities of working with mobile technologies, from handling multiple resolutions and relative pixel sizes through to using the available hardware to its full potential".

Recruitment and development

The advanced semiconductor designs we produce, and the research-intensive nature of our business, means we require a constant pipeline of talented engineers as well as individuals with other valuable skills needed in running a successful business. We currently employ hundreds of people in the UK, and as our business continues to grow we are constantly hiring new talent. We invest heavily in training and development opportunities for our people, such as system verification and programming languages. This commitment to staff development is reflected in the fact that our staff turnover rates are in line with the industry average.

When it comes to diversity, while we acknowledge the need to do more, our "Women in Tech" programme has been going from strength to strength in recent years, providing female staff at Imagination with mentoring, networking and helping them achieve greater visibility.

Schools outreach

As described in the previous section, the UK's current digital skills pipeline fails to meet the technology sector's needs. A key reason for this is a lack of awareness and understanding of technology as a career path. To help address this, Imagination recently launched a STEM outreach programme with local schools in Hertfordshire, where our global headquarters is based.

This involved Imagination staff volunteers visiting schools to perform a session centred around programming and robots for up to 30 students around the KS3 age group. The key aim of the programme is to teach students the basic decision structure of robots (and therefore coding), and explain the difference between how robots and humans "think". This directly relates to Imagination's work in the field of vision and AI, and aims to inspire and engage students with interactive and familiar technology.

While the hands-on, interactive nature of the programme has unfortunately required us to pause it in light of the closure of schools during the covid-19 pandemic, we look forward to resuming and expanding it as society returns to normality.

Work placements

In addition to helping train the next generation of university graduates through the IUP, we provide practical opportunities across our business with work placements.

Work placements exist across different parts of our business, from the aforementioned IUP to marketing, computer science and engineering. Some of our work placements have resulted in full-time roles, demonstrating their importance to our recruitment efforts.

Case study:

Anna Hedley, Senior Director of Applications Engineering

Anna Hedley is Senior Director of Application Engineering at Imagination Technologies and has worked for the company since joining as a customer engineer in 2012. Hedley supports Imagination's customers with hardware development while also managing the company's entire application engineering team based across the world.

While Hedley acknowledges the need for greater diversity, both at Imagination and in the technology industry more generally, she believes the roots of the problem lie primarily in the school system. As a young woman, despite studying maths and physics at A-levels, Headley had to overcome opposition on the part of her tutors to pursue a career in engineering. This was compounded by not knowing any engineers who she could talk to about the profession. Things became more straightforward once Hedley arrived at Birmingham University to study electronic and electrical engineering where, despite women being underrepresented, the path to a practical career in engineering became clearer.

Hedley believes a lack of both role models and understanding continues to be an issue when it comes to the UK's ability to produce engineering talent. Her experiences talking to friends' children, as well as her visits to schools as part of Imagination's STEM outreach programme, showed her that outdated stereotypes continue to characterise both young people's and parents' views of engineering. She is nonetheless optimistic about the potential for change, referencing as proof of this a talk she gave at her former school on engineering which led directly to the creation of an A-level course in electronics.

Turning Britain into a digital skills leader

Following its departure from the European Union, and as it emerges from the covid-19 pandemic, there is an opportunity for the UK to make the investments and reforms that will ensure growth and prosperity in the 2020s and beyond. To ensure that the UK is able to lead the world in the latest technologies, and create high-paying jobs, government and industry must work in partnership to provide the country with the digital skills needed for success.

"To prosper in the globally connected digital economy the UK needs technically skilled software engineers, data scientists and AI and IOT specialists who are equipped with management skills such as analytical thinking, problem-solving, teamwork, and creativity.

To achieve this, we must transform the UK's technical and vocational education system from schools to the workplace, ensure the UK is open to attracting global talent, and support diversity in digital skills, so that those from all backgrounds have the opportunity to succeed and lead in the industries of the future."

Margot James, Chair at WMG and former UK Minister for Small Business and Digital

Measures to support skills announced in the government's recently published "plan for growth", and the proposals in its recent "Skills for Jobs" White Paper, have laid the foundations for effective intervention to close the UK's digital skills gap. In response to this developing policy agenda, Imagination has identified several areas where we believe the government could have a real impact:

What government can do:

- Ensure equal emphasis on both technical skills and "soft" skills – such as financial literacy and teamwork – in schools, so that Britain's tech sector has access to the well-rounded talent it needs.

- Promote technology as a career path in schools from an early age and across demographics to address tech's diversity problem. The government should also run nationwide tailored campaigns designed to attract diverse talent into the tech sector.

- Explore the potential of remote working to bring about a more regionally balanced distribution of skilled jobs, and consider measures to facilitate this, such as investment in local connectivity and digital skills.

- Consult with British technology firms as it implements its post-Brexit immigration regime to identify any potential problems and bottlenecks in access to digital talent.

- Consider financial incentives for education - such as grants or loan forgiveness - in sectors and occupations where there is an undersupply of graduates with digital skills, to avoid the financial costs of education being a barrier to creating homegrown tech talent.

What Imagination can do:

- Expand our University Programme to more UK universities, to further the valuable support it provides in developing the technical skills and employability of university students.

- Consider the potential role of the University Programme in attracting international students to the UK, as part of the government replacement for the Erasmus student exchange programme, the Turing scheme.

- Relaunch and expand our STEM outreach programme to expose more young people to tech as a career path, including working with the government to identify synergies with its existing skills agenda.

- Support, where relevant, aspects of the government's current skills agenda, including the Institutes of Technology (IoTs), the employer-led digital skills bootcamps, and the planned introduction of new technical qualifications and programmes.

Imagination