CBI

Delivering Skills for the New Economy

Understanding the digital skills needs of the UK

June 2019
Innovation

In partnership with

TATA
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This research:

- Increases the evidence base on digital skills needs across the UK economy
- Provides case studies on innovative ways firms are addressing their digital skills gaps
- Provides insight for government to inform the National Retraining Partnership and Digital Skills Partnership

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About the partner

Tata Consultancy Services Ltd. (TCS)

Tata Consultancy Services is an IT services, consulting and business solutions organization that has been partnering with many of the world's largest businesses in their transformation journeys for the last fifty years. TCS offers a consulting-led, cognitive powered, integrated portfolio of business, technology and engineering services and solutions. This is delivered through its unique Location Independent Agile delivery model, recognized as a benchmark of excellence in software development.

A part of the Tata group, India's largest multinational business group, TCS has over 424,000 of the world's best-trained consultants in 46 countries. The company generated consolidated revenues of US $20.9 billion in the fiscal year ended March 31, 2019, and is listed on the BSE (formerly Bombay Stock Exchange) and the NSE (National Stock Exchange) in India. TCS' proactive stance on climate change and award winning work with communities across the world have earned it a place in leading sustainability indices such as the Dow Jones Sustainability Index (DJSI), MSCI Global Sustainability Index and the FTSE4Good Emerging Index. For more information, visit us at www.tcs.com.

Methodology

Our assessment included a survey as well as an extensive review of existing literature, UK and international case study evidence. The survey was in the field for three weeks from November–December 2018 and was completed by almost 250 businesses. This was supplemented with interviews with CBI members across the UK and consultation with government.

Contents

Executive Summary

Digital skills are a game-changing lever for competitiveness, business growth and inclusion

Digital skills are the cornerstone of the UK digital economy. As a crucial enabler of business digital transformation, access to digital skills is a key factor for companies deciding where to locate and invest. Ensuring people have the digital skill sets they need will transform businesses, open up job opportunities and support digital inclusion in every aspect of life.

Investing in digital skills presents a vital opportunity for UK plc in a post-Brexit world. If the UK takes strong action to develop a world-leading pool of digital talent in the next few years, not only will businesses grow faster and better deliver for their customers, but the UK could continue to forge its place as a world leader in the global digital race.

The UK is at a tipping point on digital skills. Demand already outstrips supply and is set to skyrocket

The world is changing – fast. Technology is transforming business models, opportunities, and skills needs across the economy, from ordering your coffee by app, to predicting sales trends. Digital skills are the catalyst for today's data-driven economy and demand is set to jump across all sectors and in companies of all sizes.

Businesses are cautiously optimistic they will be able to access the digital skills they need in the future. But most firms are fishing in the same pool for digital talent

Whilst 93% of business are already taking action to address their digital skills needs and most are somewhat confident they will be able to hire the digital skills they need over the next five years, the reality is that most businesses are taking the same action – they are all hiring external UK talent as their go-to solution.

Businesses know they play a vital role in addressing UK digital skills needs. To benefit from the UK's burgeoning digital economy, firms must take a more diverse and proactive approach

Businesses know they play an important part in the skills landscape, with over 80% of businesses acknowledging that they have a role and responsibility to help train the UK workforce. It's now time for businesses to build on their positive action and get ready for a gear change in upskilling across the UK workforce.

Closer government-business collaboration is key to delivering a sustainable digital skills pipeline

But business can't address the UK's accelerating digital skills needs alone. The UK must ramp up business-government collaboration and coordination if the digital skills pipeline is going to deliver effectively – today and in the future. Now is the time for action to create a world-leading digital skills supply in the UK.

Key findings

- **Two thirds** of businesses already have unfilled digital skills vacancies

- **95%** of business expect their digital skills needs to grow

- **58%** of firms say they'll need **significantly more** digital skills in the next five years

- Less than **one third** of businesses are confident that the UK business community will be able to access the digital skills they need in the next 3-5 years

- **93%** of firms are taking action to address their digital skills needs

- But almost **half of businesses are fishing in the same pool** for talent, by hiring external UK talent as their primary action to get the digital skills they need

Summary of Recommendations

To benefit from the UK's burgeoning digital economy, firms should take a diverse and proactive approach to digital skills

Business

From talking to firms up and down the country, there are five core characteristics of businesses taking action to strengthen their digital skills ecosystem:

1. Start with crafting a long-term digital vision

2. Make digital skills a company-wide initiative

3. Look to collaborate externally, for example with your supply chain, local SMEs and your Local Enterprise Partnership (LEP)

4. Inspire and support the next generation, for example extending relationships with schools and education providers and using apprenticeships as a route into digital roles

5. Harness your existing talent, by looking for hidden skills amongst your workforce, and retraining at work

Closer government-business collaboration that embeds digital skills is key to delivering a sustainable digital skills pipeline

Government

Firms can't address the UK's accelerating digital skills needs alone. The UK must ramp up business-government collaboration if the digital skills pipeline is going to deliver effectively – today and in the future. Government should:

Short-term: Ramp up coordination and minimise duplication in regional digital skills initiatives

1. Ensure all business-government initiatives at regional level, including Local Skills Plans, Local Digital Skills Partnerships (where applicable) and Skills Advisory Boards coordinate their efforts and priorities under a combined initiative

2. Mandate a digital element in all Local Skills Plans

Medium-term: Build digital understanding and core skills into any government retraining schemes

3. Include digital understanding and core skills into all schemes and programmes

4. Ensure the Government's retraining scheme has digital skills embedded, including targeted support for software engineering and data analysis skills

5. Formalise links within government on T-levels, digital skills and retraining as these initiatives develop – by creating a joint DCMS and DfE taskforce

Long-term: Set a target and develop action plans to ensure that 100% of the workforce has basic digital skills by 2025 and identify education and training changes needed to embed a sustained and world-leading digital skills pipeline

6. Business and government must work closer together to ensure the entire UK workforce has basic digital skills by 2025

7. Educating for the modern world means supporting schools, colleges, and universities to embed digital skills across every subject. The UK Government should map out the digital skills proficiency needed at each educational level

Digital skills have never been more important

In this report, the CBI and Tata Consultancy Services set out to assess digital skills needs across UK sectors – identifying how businesses categorise digital skills, how their skills needs are changing and what approaches they are taking to address these shifting requirements.

Fast-paced technological change is already transforming businesses and the jobs powering them

The UK is in the midst of the Fourth Industrial Revolution, which is set to bring seismic changes to all parts of the economy, and is worth over £445bn to the UK manufacturing sector alone.[1] Driven by technologies such as artificial intelligence, automation and biotechnology, businesses are just beginning to understand and harness the full power of the Fourth Industrial Revolution opportunity. This is shown by rapidly growing business investment in digital technologies, with 49% of businesses expecting to invest more in the Internet of Things in the next 12 months than they did in the past year.

Digital skills are a game-changing lever for productivity, business growth and inclusion — but a huge risk for the UK if we don't prioritise and invest in a world-leading digital talent pipeline

As these technologies change the foundations of business, they are having a significant impact on the nature of work and the skills that employees need in the workplace. From large companies to SMEs, construction to cosmetics firms, digital skills are now a necessity for companies' day-to-day operations as well as large-scale digital transformation ambitions. Digital technologies are already influencing jobs, from retail and hospitality workers using tablets in store, to the rise of new roles such as Chief Information Security Officers and Data Wranglers.

Many companies are experiencing rapid changes to their skills needs, reflected in the fact that three quarters of businesses are expecting to invest more in digital skills this year than they did in the last twelve months. Having the right skills to enable businesses and their employees to adapt to their changing roles and upskill for entirely new kinds of jobs will be crucial to the success of the UK economy.

As the Fourth Industrial Revolution changes the way we live as well as work, digital skills also have a crucial role to play in creating an inclusive society. As public services move online and the internet provides new spaces for social interaction, self-expression and learning, equipping people with digital skills allows them to play an active part in society whilst positively impacting loneliness and engagement amongst vulnerable groups.

The business opportunities afforded by world-class digital skills are vast

Businesses have highlighted a range of opportunities that digital skills could enable for their business:

Grow

- "Grow quicker and faster, and in turn provide more jobs, opportunities and training in the digital economy"
- "Employ more people and grow our business globally at a much faster rate"

Innovate

- "Positively impact the UK market with our innovation"
- "Push forward with many of our big ideas for improving customer experiences and optimising our manufacturing"
- "Bring new products and services to market much faster than at present"

Compete globally

- "Be a leader in our field internationally"
- "Export significantly more services to countries including outside the EU"

Yet, the evidence shows that 79% of the UK adult population have basic digital skills.[2] This equates to 11.3 million adults lacking one or more basic digital skills needed for life and work.[3]

CBI and TCS research shows that businesses continue to face difficulty accessing the digital skills they require and this comes with a significant economic impact. Nesta analysis in 2018 showed that data-driven skills shortages are already costing the UK £2bn a year[4] whilst wider digital skills shortages amongst SMEs are creating an £85bn productivity gap in the UK.[5] With UK businesses expecting demand to grow significantly in the next few years and the World Economic Forum estimating that 54% of all employees will need substantial reskilling by 2022,[6] the UK is quickly approaching a tipping point on digital skills.

In the coming years, having a world-leading talent pool for digital skills could drive UK competitiveness

Access to the skills needed for expansion and innovation is a key factor determining where a business decides to locate and invest. With the European Commission highlighting a potential gap of 756,000 unfilled ICT roles across Europe by 2020, the UK is now at a crossroads. In the coming years, the UK has an opportunity to reshape itself on the world stage by building a world-leading digital talent pool that drives business investment and global competitiveness.

If the UK takes coordinated and bold action on digital skills in the coming years, not only will businesses grow faster, compete internationally and better deliver for their customers, but the UK could forge a new place in the global digital race with an extensive pool of talent with which to leverage UK competitive advantage and world-leading business innovation.

The UK is part of an accelerating international race for developing digital skills

Governments around the world, including some of the UK's greatest competitors, have a growing ambition to create a highly digitally-literate workforce. The UK excels in some areas, such as the availability of AI talent, which is strongly supported through our world class university system. But in other indicators, such as the overall digital skills level in the population, we rank 32nd.[7] Countries such as Sweden, Singapore and Finland are making decisive investments and setting bold ambitions for the future of their digital skills ecosystems.

International leaders on digital skills

- **SINGAPORE:** As part of Singapore's Smart Nation initiative, the government has created a national initiative, Skills Future for Digital Workplace, to equip both individuals and companies with the mindset and basic functional skills for the future economy. The courses are available online, and for those who are looking to build on this with more specialist skills on cyber security, digital media, data analytics, digitisation of financial services and tech-enabled services, there are further courses.

- **FINLAND:** The World Economic Forum places Finland in the top 3 countries for availability of digital skills. A key factor for this talent pool is that Finland's government, in partnership with the private sector, has set out a bold vision for accelerating the development of advanced digital skills. The flagship initiative recently announced is their '1 percent' AI scheme which pledges to support 55,500 citizens to learn the root skills of AI technology.

- **SWEDEN:** The European Commission places Sweden amongst the most advanced digital economies, with particular strength in human capital (Sweden places 3rd). To sustain its comparative advantage, Sweden has created a bold ambition on widespread digital inclusion within its Digital Strategy. This is being delivered through a Digital Skills and Jobs Coalition (one of 17 across EU member states), launched in 2018. This multi-stakeholder coalition focuses on skills uptake, life-long learning and full employment in part by collaborating with universities to produce reskilling courses for the Swedish workforce.[8]

'Digital skills' is a catch-all term that needs unpacking if the UK is to get ahead

While the UK has made important strides to improve digital skills, business feedback reveals that the term 'digital skills' is a catch-all phrase referring to numerous skills and capabilities that can obscure rather than support businesses' skills development plans. Some digital skills are data and IT focused whilst others relate to a wider set of core skills, such as problem-solving, lifelong learning and communication.[9]

We asked businesses to define and categorise skills for the purpose of this study, which highlighted common characteristics in business definitions of basic and advanced digital skills:

- **Basic digital skills:** Businesses define basic digital skills in similar terms. For most businesses this means computer literacy such as familiarity with Microsoft Office; handling digital information and content; core skills such as communication and problem-solving; and understanding how digital technologies work. This understanding of digital technologies includes understanding how data can be used to glean new insights, how social media provides value for a business or how an algorithm or piece of digitally-enabled machinery works.

"Having the 'core skills' from the onset is most important for us. Without these you will not gain the 'buy in' of the wider business. Vision, ambition, resilience, tenacity, excellent communication skills, strong leadership skills, and empathy are some of the 'soft skills' necessary to lead a business through change and adopt digital technologies."
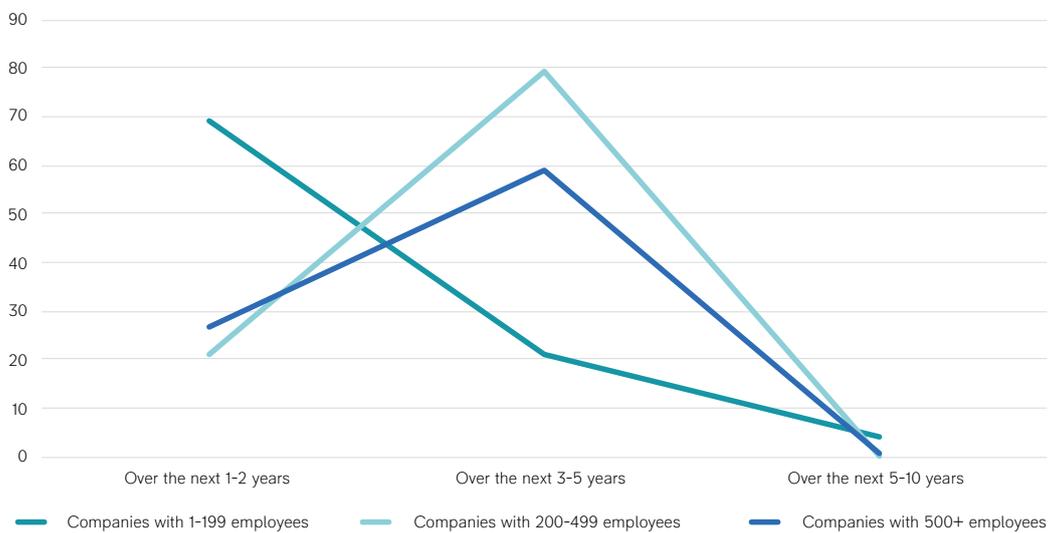
Nuclear energy company

- **Advanced digital skills:** Businesses also broadly agree on the definitions of advanced digital skills. For most businesses, these include software engineering and development (77%), data analytics (77%), IT support and system maintenance (81%) and digital marketing and sales (72%). Throughout this research, businesses have highlighted their increasing need for specific advanced digital skills, including programming, visualisation, machine learning, data analytics, app development, 3D printing expertise, cloud awareness and cybersecurity.

"We require analysts to manage large datasets and turn these into insights. This means we now find ourselves looking for a highly digitised or engineering background, as well as the ability to scan for future opportunities. At the moment we're struggling to find the people we need. They have either the engineering skills or the data skills, but rarely both."

Ian Cameron, Head of Innovation, UK Power Networks

Ultimately, businesses will require a bespoke set of both basic and advanced digital skills according to the role, as well as sector-specific knowledge. For example, employees in advanced manufacturing firms must have a solid grasp of data-driven insights and how internal systems interlink, whether they work in marketing, plant machinery, sales or finance. However, businesses have highlighted the importance of creating a diverse talent pool with transferable digital skills that can adapt to different roles and sectors. This will enable firms to look both within and beyond their industries for digital talent, which is vital considering the current UK digital skills talent gap.

Exhibit 1 When do you expect your business to feel its most acute digital skills needs? (%)

| | Over the next 1-2 years | Over the next 3-5 years | Over the next 5-10 years |

— Companies with 1-199 employees   — Companies with 200-499 employees   — Companies with 500+ employees

Now is the time for a gear-change in how the UK approaches digital skills

The UK economy is approaching a crunch time for business trying to access the digital skills they need to survive and thrive in this new economy. Most smaller businesses (69%) have reported that their digital skills needs are likely to be most acute over the next year or two, whilst 79% of medium sized businesses and 60% of larger businesses indicated their needs would be most pronounced over the next three to five years. Businesses also expect to feel the impact of unparalleled economic and political changes in the coming years, ranging from the Fourth Industrial Revolution to Brexit and immigration reform. These will impact businesses' ability to hire the talent they need, from full fibre construction specialists to PhD students with AI talent. It's imperative that businesses can access the skills they need to adapt and grow over this time.

"Digital skills are a key enabler for every company's digital transformation ambition. Now is the time for a gear-change in how the UK approaches digital skills to ensure every business can access the skills they need"

Shankar Narayanan, VP & Head, UK & Ireland
Tata Consultancy Services

The UK is reaching a tipping point

The UK is at a tipping point on digital skills. Demand already outstrips supply and is set to skyrocket. While the majority of firms are taking action, most businesses are focusing on the same pool of digital talent

Businesses from agriculture to manufacturing are in the midst of an era of transformation, driven by data and new technologies. As businesses look to reap the benefits of digital technologies and growing changes to the workplace, our research highlights the stark talent gap in the UK economy. Over two thirds (67%) of businesses are reporting unfilled digital skills needs today and less than a third (31%) are confident that the UK business community will be able to access the digital skills they need in the next 3-5 years.

Across the UK, firms are facing serious digital skills shortages

Firms are already struggling to find the people they need. Digital skills shortages are most pronounced in both the largest and smallest businesses. 76% of businesses with more than 500 employees reporting digital skills shortages, alongside 71% of businesses with less than 200 employees. This shortage is also particularly acute for sectors such as arts, entertainment and recreation; construction; and professional, scientific and technical services.

The regional picture is mixed across the UK, with our indicative regional breakdown suggesting that digital skills shortages are particularly prominent in the East of England, Yorkshire and Humberside, the South East and Northern Ireland. This widespread shortage across all sectors of the economy highlights the scale of the challenge that the UK faces if business is to embrace the new, highly digital, economy.
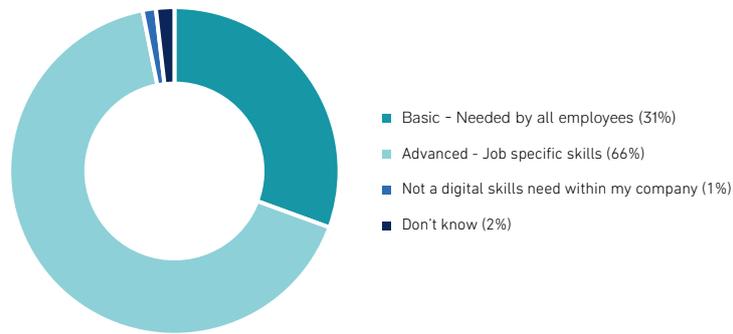
Exhibit 2 Does your business have digital skills shortages? (%)
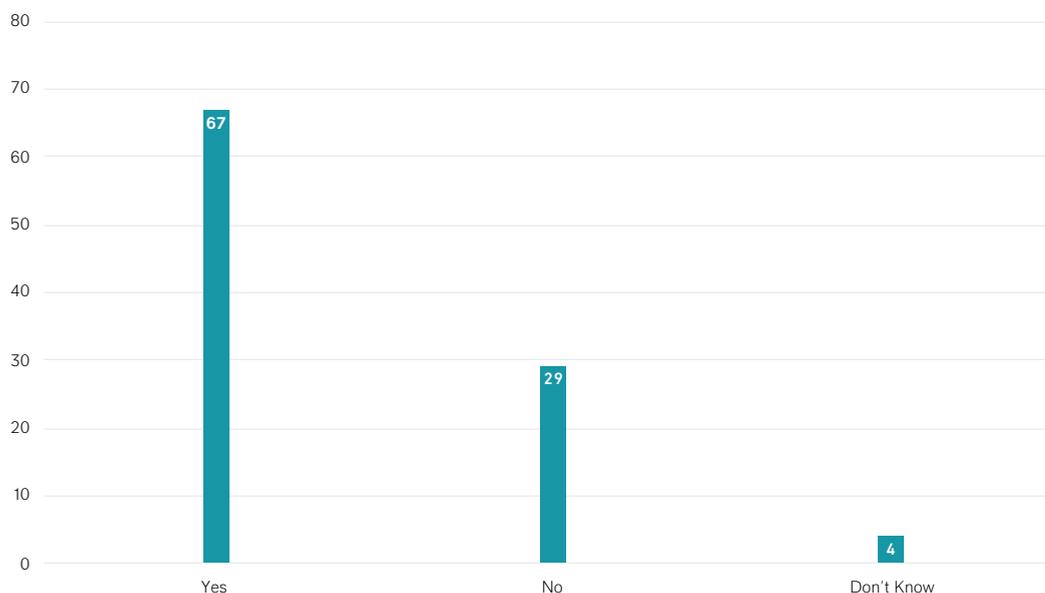
"*We need more digital skills to grow. We have a lot of work and are scrambling to develop the skills we need to complete it.*"

Web consultancy firm

Basic digital skills remain a fixed necessity on the business agenda

For many businesses, basic digital skills are increasingly seen as a core skill that all employees require. For example, as businesses digitise and use data in new ways, cyber security skills are rising in importance. One third of businesses categorise cyber and IT security as basic skills that employees need to keep their business secure, from spotting phishing emails to being GDPR aware. The CBI's survey indicates that the focus on cyber and IT as basic skills is particularly prominent in human health, energy and water services.

Exhibit 3 How does your business define cyber and IT security? (%)

- Basic – Needed by all employees (31%)
- Advanced – Job specific skills (66%)
- Not a digital skills need within my company (1%)
- Don't know (2%)

Yet some businesses are still struggling to access these basic skills, with 1 in 5 firms unable to find employees with the necessary understanding of how digital technologies work. As technology continues to become embedded across a greater number of roles and sectors, employees will increasingly need a set of basic digital skills. This means a quickly growing and widespread basic digital skills requirement across business sectors, from sales roles to using plant machinery.

Digital skills needs across the UK economy are set to skyrocket in the coming years

Not only are there current gaps in access to talent, businesses of all sizes are in full agreement that their digital skills needs are set to grow vastly in the coming years, with 95% expecting their demand for digital skills to rise. Against the backdrop of current digital skills shortages across UK firms, this future explosive growth in demand is a challenging prospect for businesses.

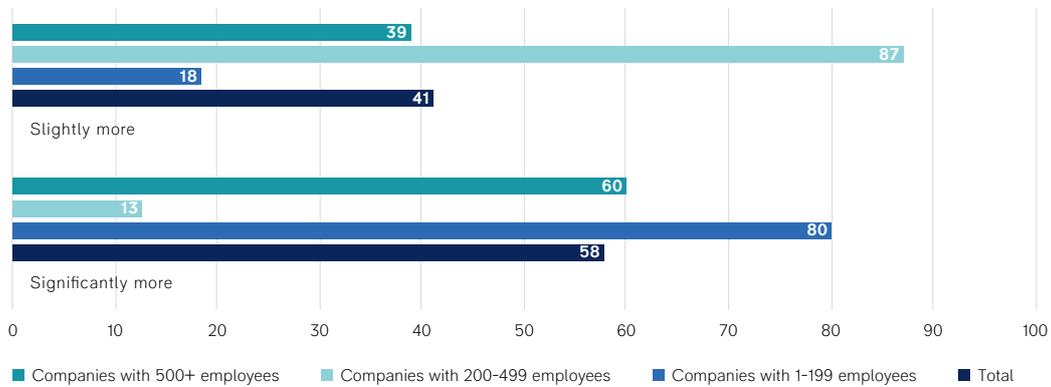**Digital skills are not just for specialist roles**

Businesses need digital skills across their organisation, with the majority of businesses highlighting the most demand at university graduate, school leaver or apprenticeship equivalent, and technical specialist levels. This is closely followed by digital skills needs at middle management and C-Suite level (CEO, COO, CIO, CFO), with 31% of firms ranking digital skills needs at this level within their top three priorities. Larger companies placed C-Suite digital skills as an even higher priority, with 53% of larger businesses highlighting this job level within their top three priorities for digital skills needs.

For businesses to be able to take advantage of rapidly advancing and data-driven technologies, those in managerial and strategic roles now require a broad understanding of technology. This includes how to assess what technology is credible, applicable to the business and how this leads to both new insights and risks for a company. An understanding of digital technologies, cyber security and data at senior levels is vital for businesses to embrace the opportunities of the digital economy and put in place modern risk management practices to prepare for and mitigate business disruption.

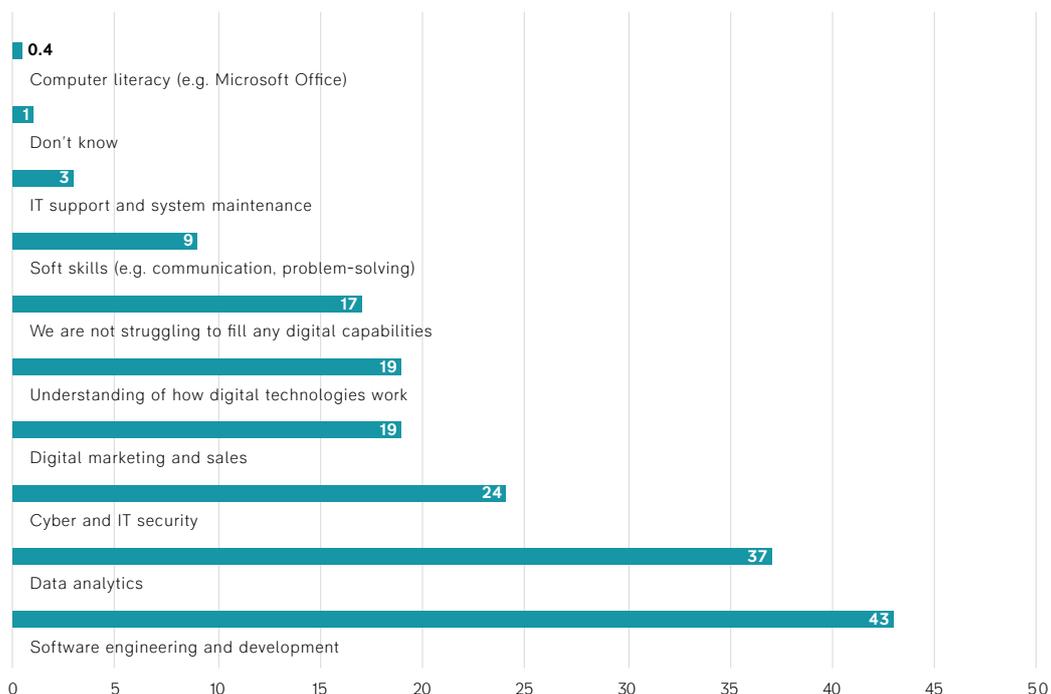**Advanced digital skills needs are expected to rapidly intensify for firms over next few years**

Advanced digital skills needs are set to markedly grow across the UK economy, with 58% businesses looking for significantly more advanced digital skills in the next five years. Smaller businesses in particular are anticipating an explosion in demand with 80% saying they will need 'significantly more' advanced digital skills. Notably, none of the businesses surveyed expected their advanced digital skills needs to remain unchanged in the next five years, and only 1% expected to need fewer digital skills than they do today.

Exhibit 4 How will your business need for advanced digital skills change over the next five years? (%)

Slightly more
- Companies with 500+ employees: 39
- Companies with 200-499 employees: 87
- Companies with 1-199 employees: 18
- Total: 41

Significantly more
- Companies with 500+ employees: 60
- Companies with 200-499 employees: 13
- Companies with 1-199 employees: 80
- Total: 58

■ Companies with 500+ employees   ■ Companies with 200-499 employees   ■ Companies with 1-199 employees   ■ Total

Across the business community, software engineering and data analytics are the most in demand advanced digital skills. Larger businesses cite high shortages for these skills with 55% of firms reporting difficulty recruiting software engineers and 61% struggling to hire data analysts, compared to 43% and 37% respectively across the business community. With a small UK talent pool of advanced digital skills, larger business struggle as they often have a large number of roles to fill, for example an entire data analysts team.

Exhibit 5 Which digital skills is your business struggling to access? (%)

- Computer literacy (e.g. Microsoft Office): 0.4
- Don't know: 1
- IT support and system maintenance: 3
- Soft skills (e.g. communication, problem-solving): 9
- We are not struggling to fill any digital capabilities: 17
- Understanding of how digital technologies work: 19
- Digital marketing and sales: 19
- Cyber and IT security: 24
- Data analytics: 37
- Software engineering and development: 43

Businesses are cautiously optimistic that they will be able to access the digital skills they need in the future. But most are fishing in the same pool for digital talent

Businesses across the UK are already taking action on digital skills

As businesses are transformed by fast-paced technological change, the vast majority of firms (93%) report that they are acting to address their digital skills needs. Encouragingly, firms are focused on building a strong talent pipeline with three quarters of businesses expecting to invest more in training on digital technologies in the next 12 months than they did in the past year. The high number of businesses taking action highlights both the influence and support that the UK business community delivers in upskilling both current and future generations for the new economy.

Exhibit 6 What investment is your company expecting to make on training to support technology adoption over the next 12 months compared to the last year? (%)
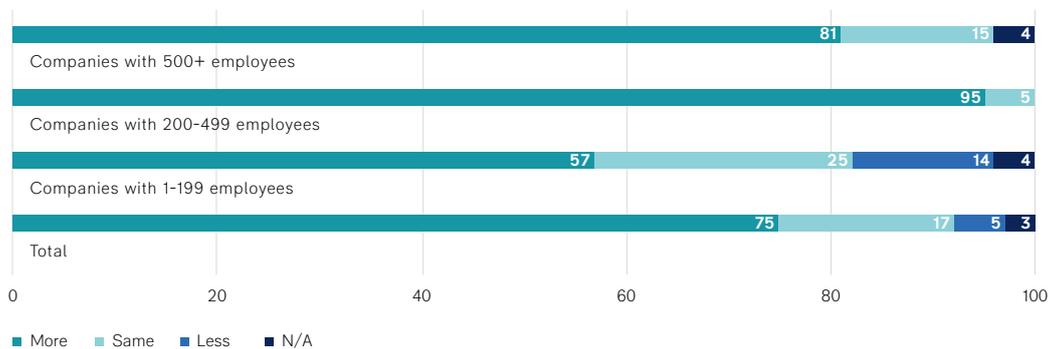
However, the landscape is different for smaller businesses. Fewer small businesses (57%) are planning on increasing their investment in training for digital adoption but are facing the most acute need for advanced digital skills over the coming years. For small businesses, this dovetailing of limited investment and high skills demand is a significant challenge that the Digital Skills Partnership should consider as it develops a framework for SMEs on digital skills.

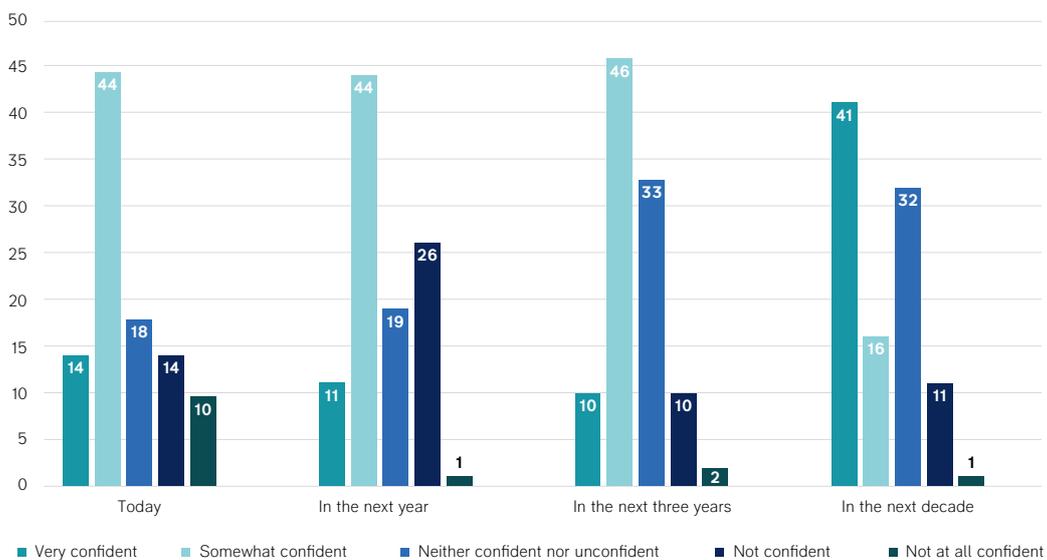*"We are a very small company without the time or money to take action"*

Carbon capture technology company

For firms not taking action to address their digital skills needs, businesses have cited a range of reasons – from capacity and cost, to a lack of strategic vision or business uncertainty about how digital transformation plans will alter their digital skills requirements.

Most firms are cautiously optimistic they will be able to hire the digital skills they need
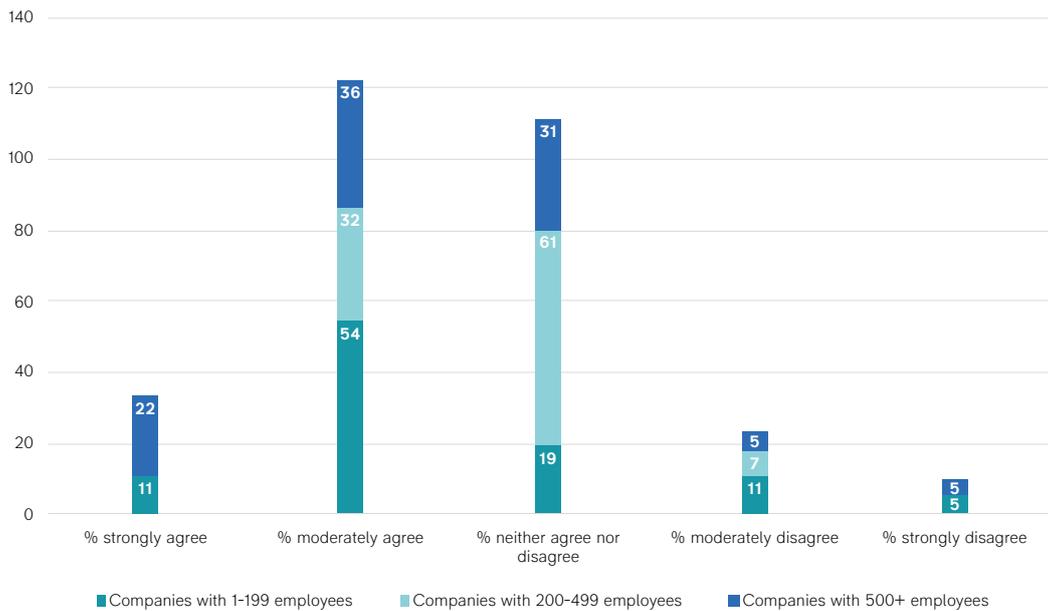
Business confidence in hiring or developing digital talent also remains cautiously positive. 56% of businesses are confident that they are spending enough on addressing their digital skills needs today. Businesses become less confident when considering whether the wider UK business community will be able to sustain a healthy digital skills ecosystem. Only a third were confident that the wider UK business community will be able to access the necessary digital talent in the future.

Exhibit 7 How confident is your business in its ability to hire the digital skills you need? (%)

Legend: Very confident · Somewhat confident · Neither confident nor unconfident · Not confident · Not at all confident

Today: 14, 44, 18, 14, 10
In the next year: 11, 44, 19, 26, 1
In the next three years: 10, 46, 33, 10, 2
In the next decade: 41, 16, 32, 11, 1

Businesses also highlight concerns about their ability to retain employees with the most advanced digital skills levels. As these skills, such as data science, are in such high demand, companies often note that their new hires only stay with the business for a few months before moving on to new pastures.

Exhibit 8 "I am confident that my business is spending enough on addressing our digital skills needs" (%)

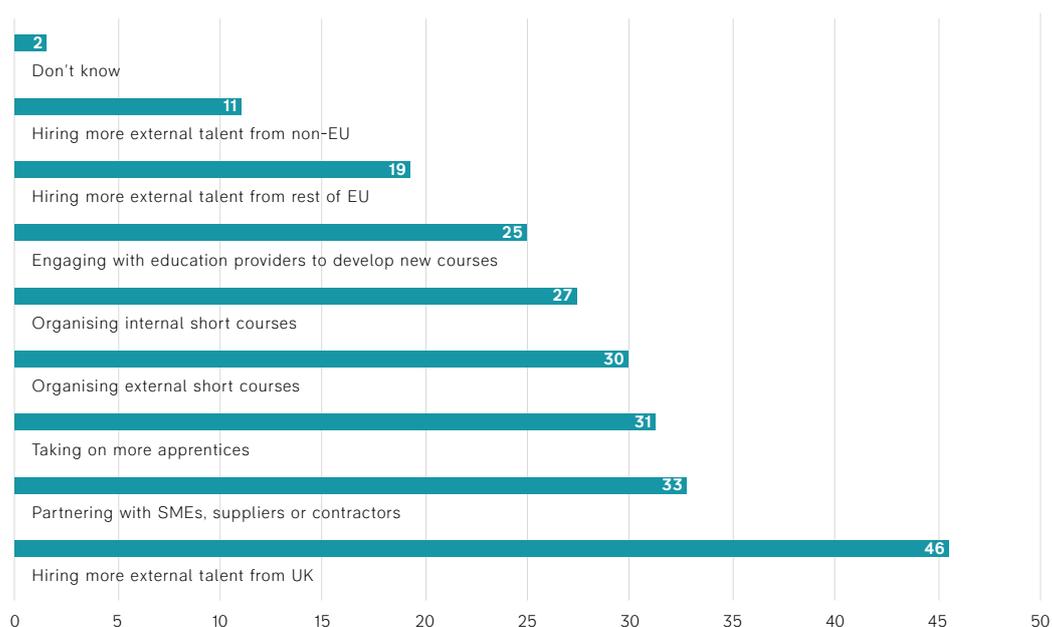|	% strongly agree	% moderately agree	% neither agree nor disagree	% moderately disagree	% strongly disagree
Companies with 1-199 employees	11	54	19	11	5
Companies with 200-499 employees		32	61	7	5
Companies with 500+ employees	22	36	31	5	

The pressing challenge is that most firms are predominantly fishing in the same pool for UK-based digital talent

While businesses are cautiously optimistic that they will be able to access the digital talent they need, the data shows that many businesses are fishing in the same pool for digital talent. When asked what action they were taking to address their business's digital skills needs, our survey revealed that most businesses are adopting a similar strategy as their primary action – hiring external staff within the UK. This means that almost half of businesses (46%) are fishing in the same pool of digital talent. Yet the pool of cutting-edge digital marketeers and data scientists that they need is limited. This emphasises a key barrier for businesses and government in co-creating an effective and sustainable digital skills pipeline in the UK.

Around a third of businesses are also taking on apprentices (31%), organising external short courses (30%) and a similar number are collaborating or partnering with small businesses, suppliers or contractors (33%) to bring in the skills they need through on the job training or placements. While government action on digital skills has focused on business and education provider collaboration, and businesses themselves see significant value in better coordinating local demand and supply, only a quarter of businesses are engaging with education providers to develop courses that suit their needs.

Exhibit 9 What action is your business taking to address your digital skills needs? (%)

Category	Value
Don't know	2
Hiring more external talent from non-EU	11
Hiring more external talent from rest of EU	19
Engaging with education providers to develop new courses	25
Organising internal short courses	27
Organising external short courses	30
Taking on more apprentices	31
Partnering with SMEs, suppliers or contractors	33
Hiring more external talent from UK	46

The action being taken by business varies markedly across sectors

The **financial and insurance sectors** are leading the way in taking a multifaceted approach to training and acquiring talent. From organising internal short courses (88%), to hiring external UK talent (88%) and engaging with educational providers to develop new courses (85%), this sector stands out for using an array of strategies to develop talent.

In **arts, entertainment and recreation** the most popular approach to acquiring talent is partnering with SMEs, suppliers or contractors (71%), far above the economy average of 33%.

Within the **manufacturing sector,** over half of firms are seeking to address their digital skills gaps by hiring talent externally from the UK. Positively for a sector looking to heavily digitise over coming years, manufacturing businesses are also partnering with SMEs, suppliers or contractors (29%) and crucially taking on more apprentices (28%).

In **construction,** the main methods of addressing digital skills needs are through an even mix of organising internal courses (38%), partnering with SMEs, suppliers or contractors (37%) are hiring external UK talent (37%). An opportunity identified through the survey was the potential for construction firms to look at hiring more apprentices. Despite the construction sector ranking the apprentice and school leaver job level as a top three priority for digital skills, only 13% of firms surveyed use this route, lower than the average of 31% average amongst business.

Our survey results highlight the critical importance of EU and non-EU talent to the **information and communication services.** Across all the economy, the ICT sector has the highest reliance on hiring talent across the EU (52%) and hiring talent from non-EU countries (22%).

"As the global body for professional accountants, ACCA is exploring how digital will impact accountancy roles and the skills required by businesses in the future. It's vital that we support both students and qualified ACCA Members in developing a rounded set of skills – including digital skills. As a strategic priority, we have been evolving our qualification and CPD over the past few years to ensure all of our students and members have the skills needed to succeed, from applying ethics in a digital age to understanding data analytics."

Judith Bennett (Director of Professional Qualifications, ACCA (the Association of Chartered Certified Accountants)

While some sectors are taking a diverse approach to building talent, more can be done across the wider business community. Firms should continue to build a proactive and diverse pipeline for their digital skills needs in the short-term, whilst longer term curriculum and school-level initiatives help support the next generation of skills. In today's uncertain environment, with mounting digital skills needs across all sectors and patchy confidence in future provision, the UK can leave nothing to chance. Businesses and government need to work together to bring certainty to the engine that will power the UK's new, highly digital, economy.

"The UK's construction sector stands to gain much from digitalisation and developing cutting-edge digital skills will be crucial. That's why CITB is funding change by giving industry leaders the skills to digitalise their businesses and in identifying the competencies construction needs to embrace digital opportunities."

Marcus Bennett, Future Skills Lead, Construction Industry Training Board

Recommendations

Businesses know they play a vital role in addressing UK digital skills needs. To benefit from the UK's expanding digital economy, firms must continue to take a diverse and proactive approach to digital skills

Beyond developing digital skills to deliver innovative products and services, businesses know they play a crucial part in the development of the skills landscape. Over 8 in 10 businesses acknowledge that they have a significant role and responsibility to help train the UK workforce.

"The world is changing and so is the way we work. It is imperative that we equip ourselves as an organisation and our future workforce in order to remain a business of the future."

Energy sector business

With CBI research showing that businesses are mostly fishing in the same pool for UK talent, there is a clear necessity for firms to diversify their strategies and look for innovative and resilient ways to address their bespoke digital needs across the business.

Based on feedback from firms across the UK, there are a number of ways businesses can support the growth of digital skills within their own business, dependent on their capacity and size:

1. **Start with the long-term digital vision**

    As the CBI's Be More Magpie report highlighted in 2018, businesses must start with what they want their technology to achieve and use this to determine what digital skills they will need to reach that vision. The CBI's Embracing Digital in Every Sector report found that companies that embrace digital have long-term strategies for investment in technology that range between 3 and 5+ years.[11] Combined with the necessary digital understanding at strategic level, a digital vision supports a company in prioritising which bespoke digital skills they need across the business to make progress.

2. **Make digital skills a company-wide programme**

    Once the vision is in place, it can be a challenge for firms to decide which part of the business should house and deliver a digital skills programme. As CBI's research shows, digital skills are often needed across the business and successful initiatives tend to involve representatives from across the organisation. Creating a Digital Skills Group or Innovation Council with representatives across the organisation can ensure that needs are met in a coordinated and cohesive way. Businesses have also flagged that early wins on retraining and enhancing digital skills can help support longer-term buy-in across both senior management and all the employees involved.

Case Study: Sellafield

Sellafield's Digital Innovation Suite brings together all parts of the business to grow digital skills and products

With the assistance of an IT services firm, Sellafield has created a modern agile Digital Innovation Suite for people across the business to collaborate on different digital projects and upskill. This is an off-network interactive room where a wide range of employees can work together to consider challenges, such as manual reporting, and trial new approaches and skills development to support this, such as automated reporting or Robotic Process Automation (RPA). Digital solution suppliers are then brought in to provide the knowledge, experience and skills training to deliver the initiative in conjunction with Sellafield. This approach has enabled an agile, fail fast, sprint based cultural change at Sellafield, providing a more accelerated route for delivery.

3. **Look to collaborate externally, for example with your supply chain, local SMEs and your Local Enterprise Partnership (LEP)**

    The businesses that have been most successful in addressing their digital skills needs often focus on local collaborations and partnerships with SMEs or larger companies to augment their internal digital skills strength and to ensure that the next generation of local talent has the skills their business is looking for.

Case Study: Centre for Process Innovation (CPI)

The Centre for Process Innovation (CPI) has partnered with SMEs to help them automate workflows and build their digital skills internally through staff training

CPI is an innovation centre based in the North East that helps companies develop, prove, prototype and commercialise next generation products and services. Local partnerships with similar size firms are key to CPI's success in developing digital talent and delivering digital solutions, for example partnering with a data science training and consultancy company to help CPI manage large datasets, automate workflows and provide the necessary internal training for the company. Finding local trustworthy partners has helped CPI build a local network and cluster of similar firms that support each other in adopting technology and providing the right digital skills for each company's digital vision.
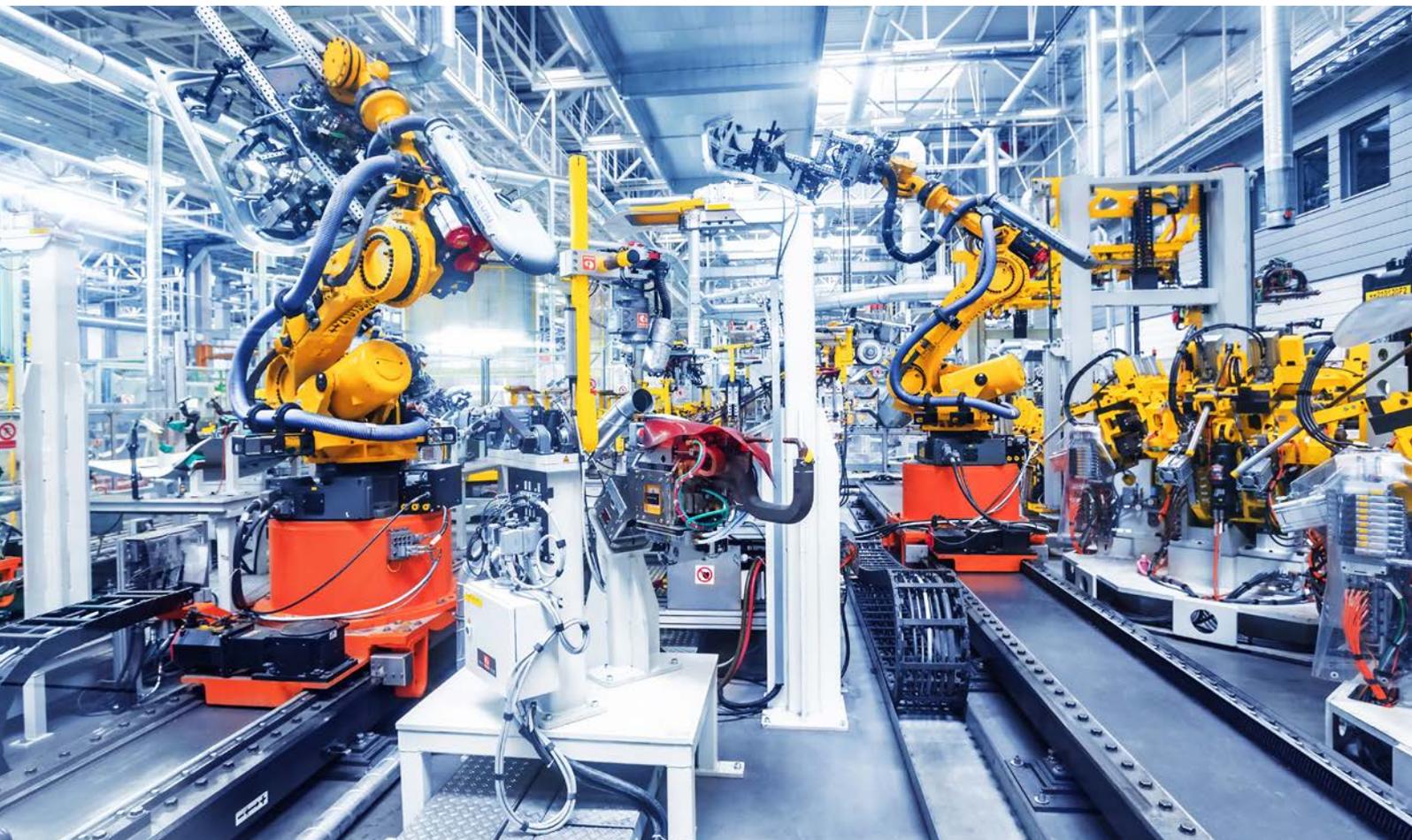
4. Inspire and support the next generation, for example by extending relationships with schools and education providers and using apprenticeships as a route into digital roles

Throughout the CBI's research, businesses have highlighted the importance of coordinating local education and skills provision with regional business demand. In the CBI and Pearson's 2018 report, 80% of the businesses surveyed were enthusiastic about getting involved in education.[10] Yet, with only a quarter of businesses engaging their local education providers, there are huge opportunities to better co-ordinate local skills supply and develop courses that enhance the competitive advantages across regions.

Young people who have at least four interactions with business at school are five times less likely to be unemployed. The CBI wants to harness the power of business and will be publishing a toolkit to support employer engagement with schools and colleges. This will illustrate the broad range of interactions employers can have with schools and colleges including governance support, curriculum design and raising aspirations through careers advice.

Case Study: Tata Consultancy Services

Tata Consultancy Services' Digital Explorers Initiative helps teenagers gear up for a digital career

In today's hyper-connected world almost all future jobs will, in at least some way, be dependent on having solid core digital skills. Tata Consultancy Services' 'Digital Explorers' initiative is a unique programme designed to nurture the digital talent of tomorrow by focusing on young people in schools and colleges. They are given the chance to take part in masterclasses and workshops to help inspire them in science, technology, engineering and mathematics to help enhance their career prospects.

The Digital Explorers programme provides teenagers with an insight into how exciting a STEM career can be, familiarising them with new digital tools and stirring their interest in the future. Showing students how smart robots work, or how cyber-crime can be tackled are effective ways of highlighting how technology will shape their future.

Working closely with charities, social enterprises, employees and the wider digital industry, TCS has already reached 300,000 UK students since launching its STEM outreach work and is helping tens of thousands more every year.

Case Study: Coventry College

Coventry College's Future Employer Engagement Panels are paving the way for innovative business and Further Education collaboration

With digital increasingly seen as the 'golden thread' of the West Midlands, Coventry College has been paving the way for business collaboration with Further Education (FE) providers.

Coventry College has been organising Skills of the Future employer engagement panels that bring together large employers, SMEs and students to hear their views on the skills students will need in the future, including panels on digital and creative skills. These panels have allowed businesses to help co-design Coventry College's curriculum and skills strategy.

The college has also hosted events looking at how jobs will change. For example, the college hosted an event on motor vehicles of the future with over 60 independent motor vehicle garages to help upskill these garages on repairing hybrid vehicles. Companies such as Toyota and Tesla have offered their hybrid models as demos for the event.

Case Study: Cardiff University

Cardiff University's Data Science Academy brings together businesses and academics to train the next generation of digital talent

Cardiff University is partnering with businesses to launch a Data Science Academy. Building on the growing data science ecosystem in the Newport/ Cardiff area, this business-university partnership will bring together local business need and provision to support a new wave of digitally-enabled Masters students.

The teaching environment, which builds upon the model piloted at the University's successful National Software Academy, is organised through projects with external companies and students work in teams on applied problems that develop both their technical and core skills. The success of this model and widespread business demand has led to the launch of the Data Science Academy, in collaboration with the Office for National Statistics, to support artificial intelligence, cybersecurity and data science at Masters level.

The Data Science Academy will support all departments at the University, allowing AI and data science skills to be taught in conjunction with other disciplines, for example computational journalism and social media. This allows people graduating with different backgrounds to have more exposure to the digital skills demanded by industry.

5. **Harness your existing talent, by looking internally for hidden skills within your workforce and retraining at work**

    Many businesses have looked internally at their workforce to find hidden and untapped pockets of talent within their existing staff.

Case Study: Sellafield

Sellafield is maximising the digital expertise and knowledge of its workforce using the 'extra 10%' model

Sellafield is making the most of the huge blend of skills within their workforce, identifying hidden skills that employees have, such as app development and programming skills

"Through the work to date we have recognised the value in cross functional collaboration and exploiting existing digital skills that are not necessarily used or visible within their typical functional areas. We haven't at this stage formulised the digital skills and profession required for the future, but we do recognise the skills available to us and are utilising these to deliver for the organisation. A key learning has been the ability to deliver results when organisational boundaries are put to one side, with all focused on the same outcome".

Neil Picthall, Enterprise Management Programme Manager (Transformation Programme), Sellafield Ltd

Case Study: Click Travel

Click Travel's cyber awareness training builds digital understanding across the business

Understanding the growing need for cyber and IT security as a basic skill across their business, Click Travel has developed innovative company-wide solutions to raise awareness of these new digital skills. The company created an initiative called Information Security Week, the aim of which was to raise awareness and educate staff on digital dangers like cyber-crime and the consequences of not keeping data secure. The business distributed guidance and information throughout the week in the form of posters, memes, and messages. All this information was collated and made available on an internal website to act as a permanent resource which staff could refer back to. There were also different activities to involve staff and spread the message in a more engaging way.

"Businesses need to continually develop their staff's skills to use the tools that your business relies on in the most efficient way possible. We use opportunities such as our monthly company presentations as a forum for sharing the latest top-tips and best practices to ensure we're getting the most out of our key technology."

Jill Palmer, CEO, Click Travel

"Digital has become the 'golden thread' of our region. Students don't just study digital skills to go into technology firms. Digital skills are part of a wider package to help other cross-cutting industries, from low carbon to housing."

**Gemma Knott, Assistant Principal, Coventry College**

Closer government-business collaboration that embeds digital skills is key to delivering a sustainable digital skills pipeline

Business can't address the UK's accelerating digital skills needs alone. The UK must ramp up business-government collaboration and coordination if the digital skills pipeline is going to deliver effectively – today and in the future.

Whilst businesses value their role in addressing the UK's growing digital skills needs, 61% businesses also strongly agree that it is important for government to take action to address digital skills gaps. The UK Government and devolved nations have made welcome strides to support skills needs for the new economy in recent years.

The UK is not starting from scratch on digital skills development – but now is the time for a gear change

The UK has made important strides to support digital skills at school and adult levels and now boasts a plethora of business, charitable and government initiatives in England and the devolved nations. Businesses are already playing an important role in upskilling both current and future generations, from Google's travelling Digital Garage that provides free basic and advanced digital skills courses, to Microsoft's Digital Skills Programme which supports teachers to deliver creative and inclusive computing lessons, offers free courses for specialists and business leaders, and helps drive new apprenticeship routes into digital careers, resulting in over 20,000 starts at Level 3 and above since 2010. It is vital that businesses build on these initiatives and that public interventions work in tandem to improve provision across the UK workforce.
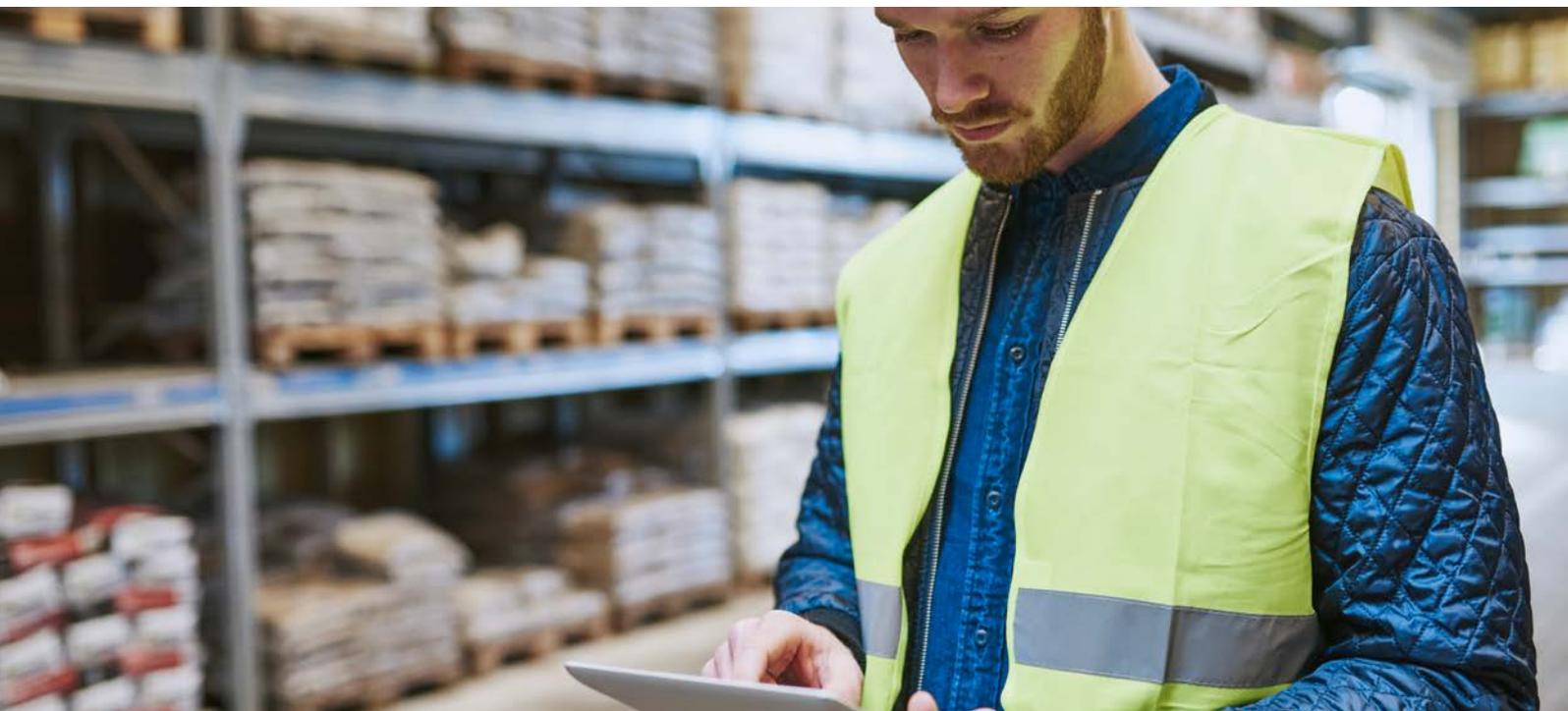
UK Government State of Play on Digital Skills

- **Digital Skills Partnership:** In the Digital Strategy, the UK government set out plans to better coordinate digital skills activities at both a national and regional level. The resulting Digital Skills Partnership Board, which the CBI sits on, aims to improve all digital skills for everyone across England and Wales. This includes coordinating business and government activities, creating a common framework for digital skills in charities and small businesses, and piloting Local Digital Skills Partnerships at regional level that bring together relevant stakeholders to coordinate digital skills demand and provision. The UK Government is also developing an AI Industrial Master's Programme and supporting AI PhD places.

- **National Retraining Partnership:** On the back of CBI calls in 2016, the UK Government announced a new partnership, comprised of the CBI, TUC, and HM Treasury, to assist the Department for Education in designing a scheme that offers workers access to guidance and training that will support them to find more secure work. In 2018, the Government announced £100m to fund the development of the scheme.

- **Teacher training:** In the 2017 budget, the UK government committed £84 million towards computer science training for teachers. This is part of a wider scheme of teacher and other training that includes the £20 million new Institute of Coding that brings together 60 universities, businesses and experts to train the next generation of digital specialists.

- **T-Levels:** Applied generals currently provide a route to careers and often lead to Higher Education – either through a combined path with A-levels, or over time. In 2017, the UK Government announced the development of T-Levels, with one of the first three pilots covering 'digital production, design and development'.. Under the reforms, there will be T-level 'pathways', each linked to a group of professions. Students will study a two-year programme, including a substantial work placement and resulting in a high-quality qualification that sets learners up for further study, an apprenticeship, or employment.

The UK now needs to ramp up its coordination and collaboration role – ensuring that its separate ambitions on retraining, digital reskilling, and wider digital inclusion create a skills environment that is greater than the sum of its parts and acts as a springboard to drive UK competitiveness.

Short-term: Ramp up coordination and minimise duplication in regional digital skills initiatives

Throughout the CBI's research, businesses have highlighted the importance of coordinating local education and skills provision with local business demand. There are a plethora of government initiatives at regional and national level, but for these to be most effective to businesses and local education providers, firms need both stability and better coordination at national and regional levels.

The UK Government therefore must:

1. Ensure all business-government initiatives at regional level, including Local Skills Plans, Local Digital Skills Partnerships (where applicable) and Skills Advisory Boards coordinate their efforts and priorities under a combined plan or initiative. These groups should also consider support for SME upskilling based on DCMS' forthcoming Digital Skills Framework for SMEs.

2. Local Skills Plans should embed digital skills. All LEPs should have a mandatory requirement to include digital skills in their local plans and monitor progress on building digital skills in their locality. This should be monitored by BEIS in collaboration with local government on a yearly basis.

Medium-term: Build digital understanding and core skills into all government retraining schemes

Retraining will be a vital aspect of ensuring people have the right skills for the future. Any government retraining scheme must build a future-proof framework for retraining to help people learn the skills they'll need for the new data-driven economy and support them in moving jobs.

Therefore, the UK Government must include the following principles on digital skills within its core skills initiatives as these develop:

3. **Include digital understanding and core skills into all schemes and programmes**
   As roles across all UK sectors are being transformed by digital technologies, the Government should ensure that development of a national retraining scheme should include an understanding of how digital technologies work as a core part of the offer, using it as spring board to develop further digital skills.

4. **Ensure the Government's retraining scheme has digital skills embedded, including targeted support for software engineering and data analysis skills.** The development of the National Retraining Scheme should continue to be informed by employer evidence on digital skills shortages. Across small, medium and large businesses, advanced digital skills needs are set to grow rapidly. The National Retraining Scheme is well placed to collaborate with employers and employees to address the acute shortage in software engineering and data analytics skills.

5. **Formalise links within government on T-levels, digital skills and retraining as these initiatives develop.** Many of the cross-departmental skills and technical education initiatives have close synergies in their aims to support skills-building and share prosperity across the UK. DCMS, DfE and HMT should therefore formalise linkages between their respective work on digital skills, retraining and technical education. This means:

   • Creating a joint taskforce between DfE and DCMS to develop digital skills policy and feed the latest thinking into T-Levels development and retraining

Long-term: Set a target and develop action plans to ensure that 100% of the workforce have basic digital skills by 2025 and identify education and training changes needed to embed a sustained and world-leading digital skills pipeline

The UK is in a global digital skills race and needs to maintain a bold vision to stay internationally competitive. Ensuring people have the digital skills they need will transform lives, open up job opportunities and support digital inclusion in every aspect of life. A shared vision will support government and business to work more effectively and collaboratively together and ensure the UK remains in the global race for digital talent.

6. Business and government must work closer together to ensure the entire UK workforce has basic digital skills by 2025

For the UK to keep up with its international competitors, the government must commit to an ambitious goal by 2025 and set out to achieve this by creating a workplan with extensive government-business collaboration. Essential to this goal will be ensuring the UK education and training system adapts to meet the opportunities of a technological future.

7. Educating for the modern world means ensuring schools, colleges, and universities embed digital skills across all subjects, ensuring that the next generation has the right skills for a highly digitised economy, across all roles. The UK Government should map out the digital skills proficiency needed at each educational level.

The CBI will be conducting further research this year on what it means to be 'work-ready' and how the education and training system can support this.

"The UK is in global digital skills race and needs to maintain a bold vision to stay internationally competitive."

Matthew Fell, CBI Chief UK Policy Director

References

1 Made Smarter Review, 2017

2 Basic Digital Skills UK report, Ipsos MORI 2017

3 UK Consumer Digital Index, Lloyds Banking Group 2018

4 Data-Driven Skills Taxonomy Report, Nesta 2018

5 UK Business and Charity Digital Index, Lloyds Banking Group 2018

6 The Future of Jobs Report, World Economic Forum 2018

7 The Global Competitiveness Report, World Economic Forum 2018

8 For sustainable digital transformation in Sweden: a Digital Strategy, Government Offices of Sweden 2017

9 Learning to Learn: The Future-Proof Skill, Artificial Intelligence All Party Parliamentary Group, Big Innovation Centre and KPMG, 2018

10 Embracing Digital in Every Sector, CBI 2016

11 Educating for the Modern World, CBI & Pearson, November 2018

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