bcs
The Chartered Institute for IT

2019 | REPORT

APPRENTICESHIPS

PREPARE FOR TOMORROW'S DIGITAL SKILLS PRIORITIES TODAY

Making IT good for society

APPRENTICESHIPS

PREPARE FOR TOMORROW'S DIGITAL SKILLS PRIORITIES TODAY

CONTENTS

INTRODUCTION

AS A FORMER APPRENTICE MYSELF, I'M IMMENSELY PROUD OF BCS' PART IN CHAMPIONING EMPLOYER-DESIGNED APPRENTICESHIP STANDARDS, AND OUR ROLE IN END-POINT ASSESSMENT.

Paul Fletcher,

CEO. BCS, The Chartered Institute for IT

To date, we have close to 14,000 apprentices registered with BCS. This is as a result of our many fantastic partnerships with employers and training providers. I genuinely believe when we all work together we can collectively achieve great things to raise digital skills. And for that, I thank everybody involved.

As the Chartered Institute for IT, we believe that apprenticeships play a critical role in plugging skills gaps and helping to modernise the workforce. That's why BCS has, from day one, championed the new employer-designed digital apprenticeships.

Paul Fletcher,

CEO. BCS, The Chartered Institute for IT

1. EXECUTIVE SUMMARY: THE SKILLS EMPLOYERS NEED

Digital skills are no longer just the tech sector's concern. Rather, as businesses transform how their products are built and their services are delivered, digital skills are essential in all sectors. BCS has seen that first-hand through its work with a wide range of businesses – many of whom are now benefitting from digital apprenticeships.

It's not just the number of businesses using apprenticeships telling us that employers value digital apprenticeships. We've done research too. 71%[1] of levy paying employers (surveyed by BCS) reported that they see significant returns on their apprenticeship investment.

It's great news that more employers are seeing the apprenticeship levy as an investment and not just a tax burden. They are seeing that apprenticeships deliver tangible returns now – and will do in the future. We also know that there's still more to do to help other employers reap even greater benefits.

It's not only large businesses that can benefit. Apprentices add value across the workforce, whether they're part of small, medium or large enterprises. What some smaller organisations may not know, is that employers who have an unspent apprenticeship levy can transfer the excess funds to other employers, supporting skills development right through the supply chain.

2. INSIDE THIS REPORT

This snapshot report takes stock of employers' reflections on digital apprenticeships. Through surveys, BCS has asked employers about common challenges, the technologies dominating boardroom thinking and their expected operational priorities for the future.

These boardroom level considerations naturally steer employers' needs for new talent, skills sets, thinking and capabilities. As you read on, we'll explore all of these factors, and more, as we look at apprenticeships from an employer perspective.

2.1 Key findings

- 71% of employers indicated that the apprenticeship levy is returning a high return on investment.[1]
- 82% of participants think that digital apprenticeships are relevant to businesses today.[1]
- After completing a digital apprenticeship, 73% stated that it is important to their organisation that an individual appears on a professional register of competence.[1]
- When asked to identify their organisation's top five priorities for 2019, the top answers from IT leaders were continuous innovation (54%), operational efficiencies (52%), and business transformation and organisational change (45%)[3].
- 54% of participants claim that their organisation currently uses AI or machine learning applications[4].

3. THE STORY BEHIND THE SKILLS GAP

The digital world is changing quickly and customers' tastes and expectations are shifting constantly. Today, businesses need to listen to data and make decisions based on it. Miss a critical signal and you risk losing customers.

To understand and to quantify what digital leaders feel about shifting pressures, BCS has, for the last eight years, been surveying its members to get a sense for what they feel about their roles, resourcing needs and areas of concern for the forthcoming year. Which technologies, resources and approaches are being deployed to meet the modern world's demands?

For 2019, this survey covered more issues than ever. The survey – called IT Leaders[3] - was expanded to include more on skills, training and the ethical landscape.

For an understanding of the skills gap, employer needs and where apprenticeships can help address shortfalls in expertise, such insight is invaluable. The survey's data sheds light on the skills employers need to meet today's business objectives and also points to technologies that businesses are eyeing for the future.

Unsurprisingly, technologies like AI are gaining momentum. It follows then, as this momentum leads to products being deployed, employers are looking to increase the number of skilled and experienced people in their workforce.

Key findings, many of which give insight into the shape and scope of the skills gap, are[3]:

- The priorities for 2019 are continuous innovation (54%), operational efficiencies (52%), and business transformation and organisational change (45%).
- When asked to single out their number one priority, 22% chose business transformation and organisational change.
- The technologies that organisations are prioritising for 2019 are cloud (53%), cyber security (52%), automation (36%), IT governance (34%), and agile methods (also 34%).
- When asked to identify their top priority, cyber security and cloud could not be separated, with both on 15%.
- Only 12% of participants feel their organisation has enough resources to achieve success in 2019.

Looking at the technologies or approaches that organisations were prioritising for 2019, we saw cloud (53%), cyber security (52%) and automation (36%) were top priorities.

Moving down the list of technology focuses, we found 21% of respondents mentioned artificial intelligence. AI is, this data shows, becoming a reality for business and not just a piece of horizon scanning.

The BCS report, specifically on AI, digs deeper[4] asking respondents what AI means to them within the context of their business. You'll find a fuller exploration of AI from an employer's perspective on page 14.

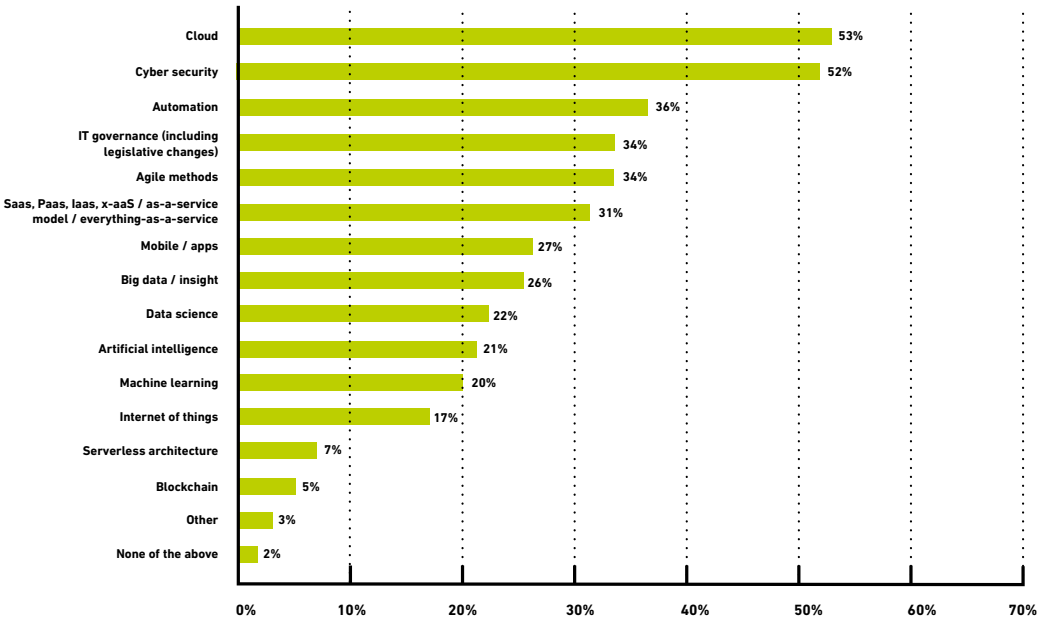
The *IT Leaders* report also asked what additional resources leaders felt they need to meet tomorrow's organisational challenges.

52%

OF ORGANISATIONS ARE PRIORITISING CYBER SECURITY AS A MAJOR PRIORITY

Figure 1:

WHICH OF THE FOLLOWING TECHNOLOGIES OR APPROACHES IS YOUR ORGANISATION PRIORITISING FOR 2019? (PLEASE SELECT UP TO FIVE)



Source: BCS IT leaders report 2019

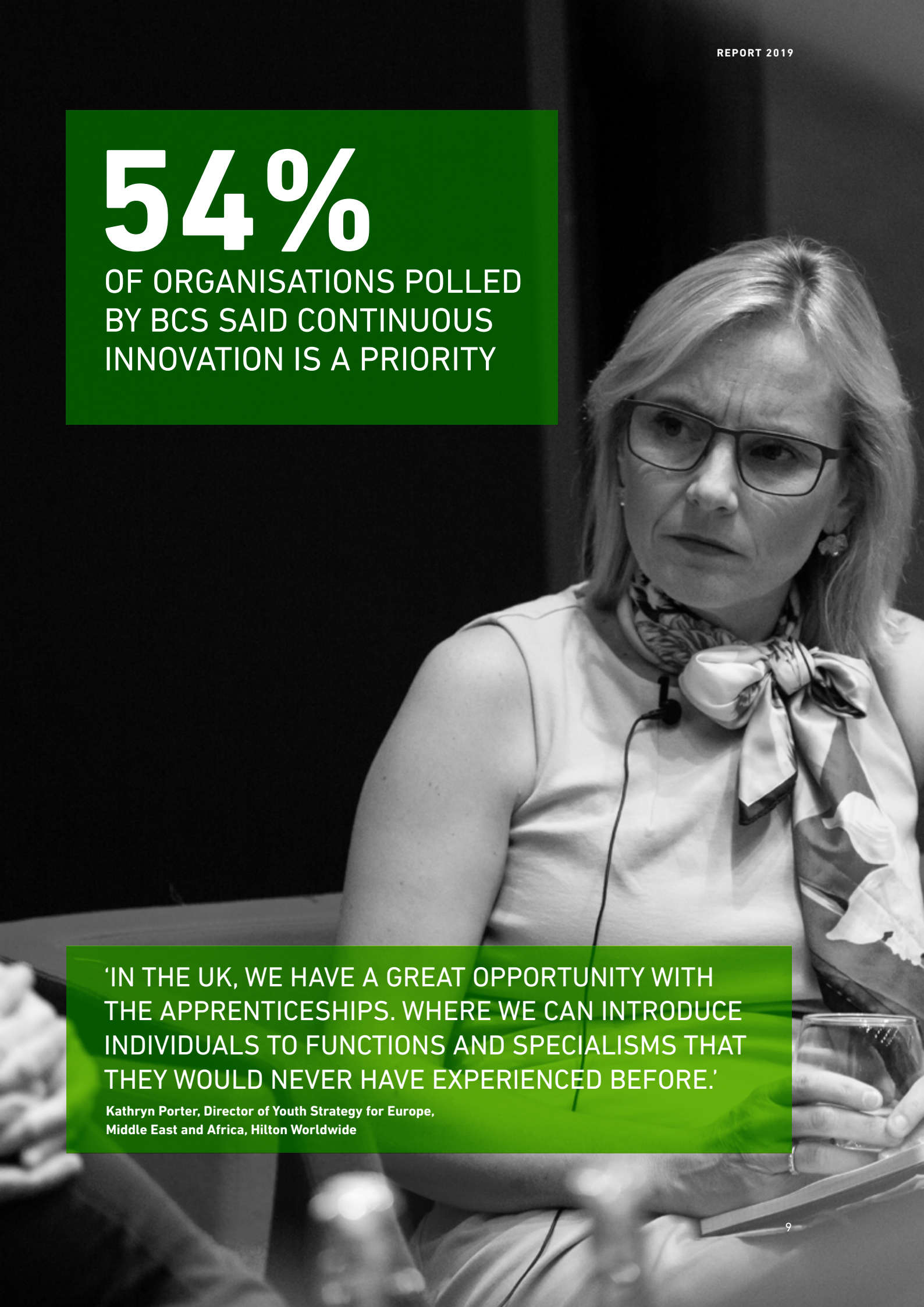
Top of leaders' wish lists were upskilling their existing workers, next, we can see that additional staff with suitable qualifications are what's needed. Both requirements – better skills and more qualified people – out-rank bigger budgets. This finding shows how important correctly skilled people are to employers.

Looking specifically at capability gaps within organisations, *IT Leaders* found that: cloud, security, data and business skills formed the largest proportion of the total skills gap.

The *IT Leaders* survey also asked how organisations planned to address their capability gaps. Up-skilling / on-the-job training came out top with 74%[3] of respondents reporting that this would be their chosen route.

82%

OF PARTICIPANTS THINK THAT DIGITAL APPRENTICESHIPS ARE RELEVANT TO BUSINESSES TODAY.[1]



54%

OF ORGANISATIONS POLLED BY BCS SAID CONTINUOUS INNOVATION IS A PRIORITY

'IN THE UK, WE HAVE A GREAT OPPORTUNITY WITH THE APPRENTICESHIPS. WHERE WE CAN INTRODUCE INDIVIDUALS TO FUNCTIONS AND SPECIALISMS THAT THEY WOULD NEVER HAVE EXPERIENCED BEFORE.'

Kathryn Porter, Director of Youth Strategy for Europe, Middle East and Africa, Hilton Worldwide

4. APPRENTICESHIPS AND SKILLS TODAY

When it comes to filling the skills gap, today's employers are clearly turning to apprenticeships. In a recent survey, BCS found that 82% of participants felt apprenticeships are relevant to today's businesses[1]. What's more, it seems clear that employers see the apprenticeship process as the start of a journey – and not just a solution to a resource problem. After completing a digital apprenticeship, 73% of employers said that they felt it was important that these newly qualified practitioners appear on a professional register of competence.[1]

In terms of the most popular digital apprenticeships software developer, network engineer and data analyst were the most common programmes[1] used by the respondents of the survey. In comparison, infrastructure technician is the most popular apprenticeship in the government's recorded national apprenticeship starts and digital marketer has also become increasingly more popular over the last year than the responses to our survey would suggest.

Elsewhere, for example, the *BCS IT Leaders* report found that cyber security scored as organisations' joint number one technology priority for 2019. This real-world organisational focus on cyber security, unsurprisingly, aligns neatly with the most popular apprenticeships standards that are being deployed by those who took part in our survey.

4.1 Apprenticeships follow real world demand

BCS found that 35%[1] of organisations surveyed delivered the cyber security technologist apprenticeship and 28% of employers deployed the cyber intrusion analyst programme. Combine the two – and correct statistically for double counting – and you see 46% of organisations surveyed investing in apprenticeships that link directly to cyber security.

Returning, again, to the 2019 *IT Leaders* report, we asked organisations to single out their number one organisational priority[3]. The top scoring option was business transformation and organisational change. Looking at the most commonly delivered apprenticeships graph (next page) it is possible to see this drive for transformation being echoed too.

All the skills needed to transform a business: software development, network and infrastructure skills all score highly in data showing which apprenticeships standards have been deployed. These are, after all, the abilities needed to build new infrastructures and the software applications that work on them. Or, to put it another way, these are the skills needed to digitally transform and move a business from paper to bits, bytes, pixels and the cloud.

4.2 Relevant to challenges businesses face

This alignment between the most commonly delivered apprenticeships and organisations' biggest focuses suggests that apprenticeships are very relevant. Our apprenticeship survey dug deeper into the question of relevance and asked employers directly how relevant they believed this mode of training is. In all, as we've said previously, 82% of respondents said they felt that apprenticeships were relevant to businesses today. Only 1% felt that apprenticeships were not relevant at all.[1]

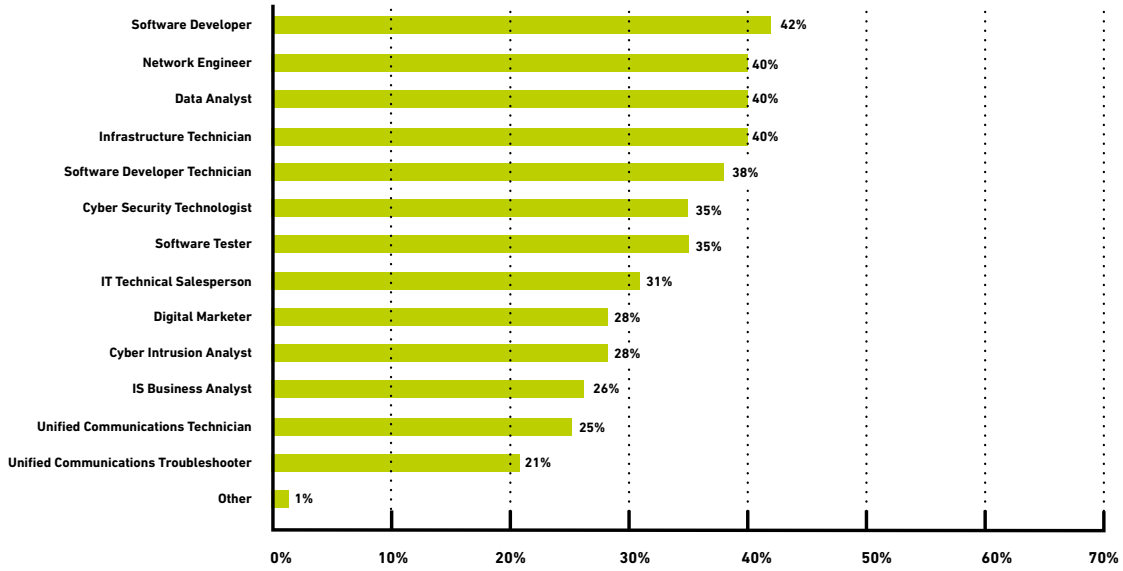
Rather than being viewed as a tax, employers are taking a positive view of the apprenticeship levy. We asked employers whether they thought the levy delivered high returns on investment. Only 3% reported that they felt that paying the levy delivered a low or very low return on investment. Indeed, the true story is found at the other end of the spectrum. Of those surveyed, 71% felt that ROI was high or very high.[1]

In summary, by bringing together two BCS surveys we see a consistent story: employers have – like all businesses – organisational and technical challenges that need to be addressed. They find that apprenticeships are proving to be a relevant means of meeting these challenges. This carries through to many employers seeing a high return on investment from their apprenticeship schemes.

'WE ARE INTERESTED IN THE CULTURE, IDEAS AND INNOVATIONS APPRENTICESHIP-THINKING CAN BRING.'[2]

Figure 2:

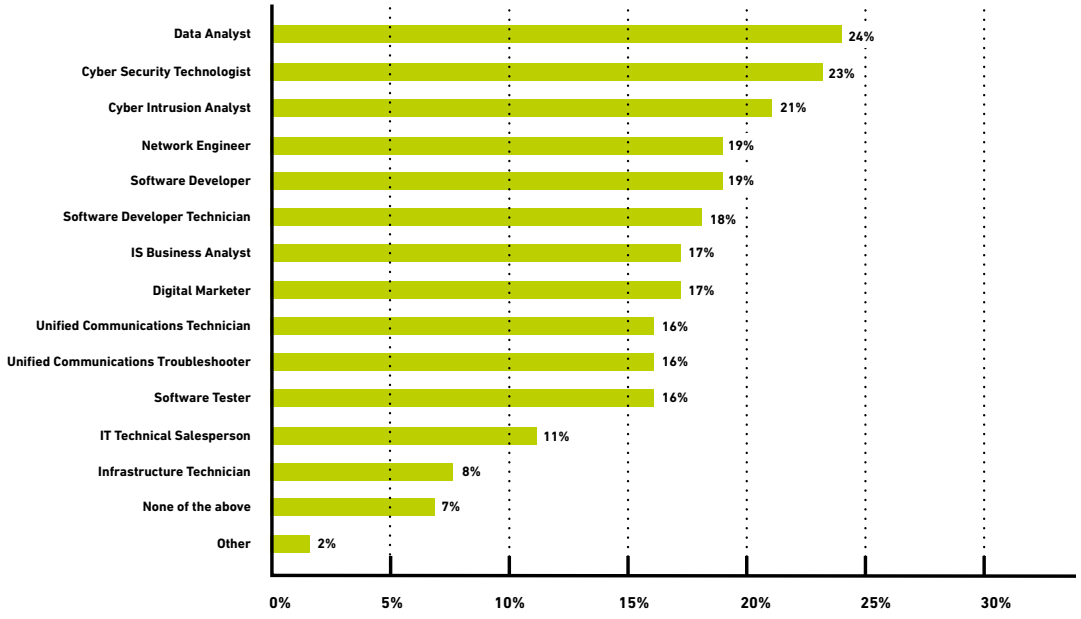
WHICH OF THE FOLLOWING DIGITAL APPRENTICESHIP STANDARDS, IF ANY, IS YOUR ORGANISATION DELIVERING? (TICK ALL THAT APPLY.)



Source: BCS apprenticeship survey 2019

Figure 3:

WHICH OF THE FOLLOWING DIGITAL APPRENTICESHIP STANDARDS, IF ANY, IS YOUR ORGANISATION PLANNING TO DELIVER WITHIN THE NEXT 12 MONTHS?



Source: BCS apprenticeship survey 2019

5. APPRENTICESHIPS AND SKILLS FOR TOMORROW

Organisations are generating ever increasing amounts of data. Whether it's through customer relationship management systems, internet of things, locational telemetry, supply chain monitoring or real-time website activity – businesses are producing data at a galloping rate. Smart businesses adapt through analysing data. When there is too much data for humans to access, they are turning to AI for their business intelligence.

5.1 Recurring themes

This drive for data analysis and the desire to generate business intelligence from information is a theme that's echoed across several recent BCS reports.

Looking at IT Leaders[3], for example, we can see that big data/insights (26%), data science (22%) and AI (21%) all appear in a list of priority approaches for 2019. In isolation, the scores place these approaches towards the bottom of our list. But this is slightly misleading. They should be viewed together as they are interlinked. Without data – that's been analysed and prepared – you can't build and deploy AIs.

Further up the table of priorities you see automation and cloud too. Again, automation can be a big data story – to automate, you first need to gather and analyse data about the process that's going to be turned over to robots and AIs. And, given the volume of data generated it needs to be stored somewhere – little wonder then cloud scores top of the 2019 priorities list (cloud being, in part, a storage solution).

5.2 Cyber security

We saw previously in this report that cyber security dominated organisations' agenda right now and this was echoed in the demand for cyber security apprenticeships by those who took part in our survey.

This trend in demand for cyber skills is even more pronounced in the data gleaned from asking employers which apprenticeships standards they planned to deliver in the next 12 months[1].

Looking at the future data, cyber security technologist and cyber intrusion analyst moved individually from the lower half of the apprenticeships standards delivered currently, to number two and three in a list of planned apprenticeships.[1] Cyber security dominates boardroom thinking today – it will do tomorrow – and is a driver for future apprenticeship starts too.

Again, looking at standards delivered now, data analyst was the second most regularly delivered. If we turn our attention to standards that employers say they will deliver in the next 12 months, data analyst jumps up to the number one spot. This, in many ways, aligns with the findings of the IT Leaders report. It showed that data insights, data science and AI were all big focuses for organisations and will be in the future.

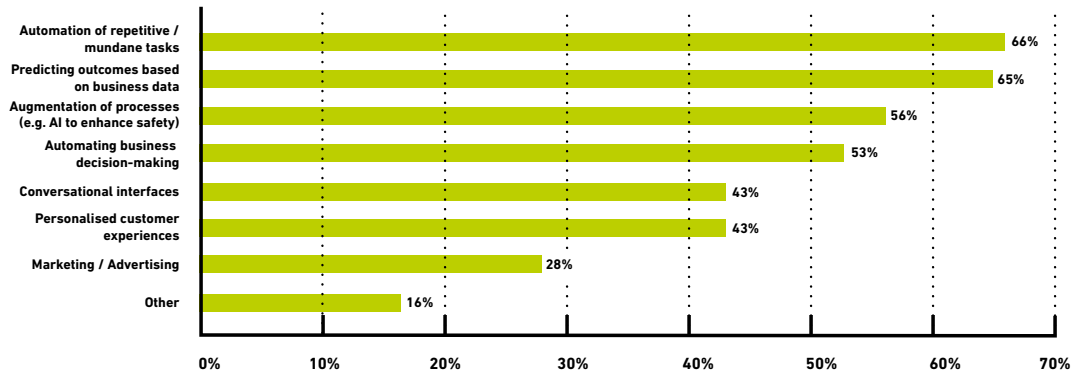
By combining data about apprenticeships delivered today and the standards delivered tomorrow, we can see that software development and network engineering are skills employers are also prioritising. In both instances – delivered today and planned for tomorrow – both apprenticeship standards appear close to the top of the two league tables.

So, what does all this tell us? In many ways we can say that apprenticeships are working. The close link between what businesses are telling us about their future organisational priorities and the apprenticeship standards planned for delivery in the future, shows that apprenticeships are highly relevant to achieving tomorrow's business objectives. Indeed, when BCS asked whether respondents felt there were any gaps in the current digital apprenticeship standards, nearly half (47%) said 'no'.

To keep the skills pipeline growing there is, however, a need for a ready supply of digitally literate people who possess the skills and knowledge needed to support apprenticeships.

Figure 4:

WHAT DO YOU THINK YOUR ORGANISATION'S FUTURE AREAS OF INTEREST WILL BE IN RELATION TO AI (PLEASE TICK ALL THAT APPLY.)



Source: BCS Artificial intelligence report 2019

6. THE AI SKILLS GAP

Artificial intelligence is dominating the news headlines. To gauge the boardroom's attitude toward the technology, BCS commissioned an new piece of research that asked leaders and managers about the organisations' views on AI.

Key findings:

- 54% of participants claim that their organisation currently uses AI or machine learning applications.[4]
- A further 15% have plans to use AI applications in their company (or 32% of those who don't currently use it).[4]
- Among organisations currently using AI applications, the top two uses are the 'automation of repetitive / mundane tasks' (48%) and 'predicting outcomes bases on business data' (46%).[4]
- To help develop or implement their AI solutions, the skills that respondents consider to be missing are technical skills (56%), data analysis skills (50%) and integration to business processes (48%).[4]
- 64% of respondents believe that AI will be important (top two boxes) in enabling their organisation's long-term goals. [4]

The survey that underpinned the report asked businesses about their current uses of AI and their future plans for deployment. Currently 48% use AI for automation, 46% for predicting outcomes based on business data and 37% for automating business decision making.

When it came to future areas of interest, the same areas as 'currently used' were identified as the top two choices.

Marketing/advertising scored the lowest out of the seven options presented, but was still of interest to 28% of respondents who currently use AI or had plans to use it. Future areas of interest were generally higher for larger organisation's compared with SMEs. For example, 71% of respondents from larger organisations selected automation of repetitive/mundane tasks compared with 50% of SMEs.

6.1 What skills do employers need?

Participants were asked which skills they consider are missing in their business today, that would help them develop/implement their AI solutions.

The top answers were technical skills (56%), data analysis skills (50%) and integration to business processes (48%). Organisations outside the IT industry are more likely than those within the IT industry to cite technical skills (62% versus 45%).

Data analysis scoring so highly is noteworthy. Back on page 12, we saw that the IT Leaders report highlighted data was a priority for 2019. We also saw that the data analysis apprenticeship standard was increasingly deployed now and more likely to be deployed in the future. Combine these findings with the above data about skills needed to help employers develop and implement AI solutions and the message becomes clear: people able to work with data and analyse it, are in high demand now and the demand for those skills will only grow as businesses develop and deploy AI solutions.

6.2 Demand will grow

The BCS AI report also found that investment in AI is expected to increase over the next five years. In five years' time 78% expect their organisation to be investing in AI research and innovation. This is a significant increase on today's stated AI investment profile. Today, the BCS AI report found that nearly one-quarter of respondents claim that their organisation does not invest anything in AI innovation and research.

‘DIGITAL IS SO BROAD AND DEEP THAT I FORESEE HUNDREDS OF DIGITAL APPRENTICESHIPS IN THE FUTURE: AI, DATA ANALYTICS, CYBER, AUTOMATION, IOT, VR...’

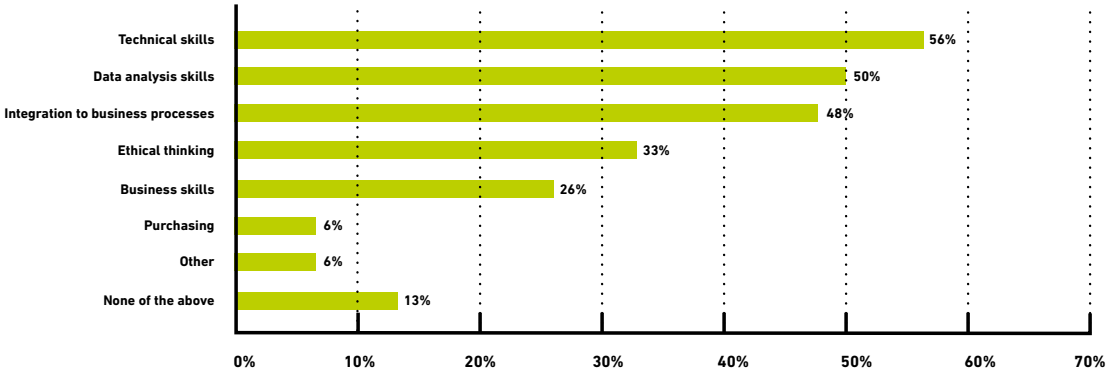
‘THE CORE TO WHAT I’VE BEEN DOING FOR 30 YEARS, IS HOW TO CREATE TECHNOLOGY CAPACITY. IT’S A TIME OF TRANSFORMATIONAL CHANGE IN BIG BUSINESS AND SMALL BUSINESS.’

Julian Burnett
VP & Executive Partner – Retail Markets Strategy at IBM UK

15

Figure 6:

TO DEVELOP/IMPLEMENT YOUR AI SOLUTIONS, WHICH SKILLS DO YOU CONSIDER ARE MISSING IN YOUR BUSINESS TODAY? (TICK ALL THAT APPLY.)



Source: BCS artificial intelligence report 2019

7. DIVERSITY AND APPRENTICESHIPS

BCS has long researched, debated, championed and looked to influence policy about diversity in IT. Our work began initially by looking at just the representation of women in IT but, over the last few years, our ambitions have grown and we've explored ever widening dimensions of diversity across gender, ethnicity, age and disability. BCS has explored social mobility with its Moving On Up report - **www.bcs.org/content/conBlogPost/2756**

Beyond being the right thing to do, research shows that organisations that encourage diversity in their workforce see enhanced objectivity, improved product design, different thinking approaches and heightened levels of innovation.

Harvard Business Review took a industry with plentiful records and a consistent approach – the venture capital industry – and found compelling arguments in favour of diverse teams. Back in 2015, McKinsey research drew direct lines between organisations that have good racial, ethnic and gender diversity with financial returns above national industry medians.

By boosting inclusivity and diversity, employers also widen the pool for talent from which they are recruiting. And, for an industry where the skills gap is a big concern, it seems perverse that some organisations recruit – consciously or unconsciously – from a narrow pool.

Imagine how many more people we could welcome into the industry – via apprenticeships – if we embraced diversity more readily. Indeed, BCS data shows that of (June 2019) 13,699 registered apprentices only 2,955 were female. The opportunity diversity affords the IT industry is clear.

7.1 Diversity gender key findings[5]

- Women accounted for 50% of the working age population in 2018 (those aged 16-64), 47% of those in work and 46% of the unemployed.
- There were 226,000 female IT specialists in the UK workforce during 2018 – 16% of the total at that time.
- The gender balance for IT specialists was worse within the manufacturing, construction and IT sectors (where women accounted for just 12%, 12% and 13% of IT specialists).
- Female IT specialists were almost five times more likely to be working part-time than males (i.e. 14% versus 3%) – most often as they did not want full-time work.
- Female IT specialists appear just as likely to be in 'responsible positions' (i.e. those with managerial/supervisory responsibilities).

8. SOURCES

1. This report was generated on 23/ 04/19. Overall, 200 employers completed this questionnaire during the period 8–11 April 2019. The survey was conducted online and respondents were sourced via a panel provider, Cint. To qualify for the survey, respondents were either directors , managers or other decision makers; and their organisation had employed a digital apprentice or used the levy to upskill their existing workforce. Fieldwork was restricted to England only.

2. BCS Apprenticeship Survey – This report was generated on 23/4/19. Overall, 35 employers and training providers completed the questionnaire during the period from 31 January to 22 March 2019.

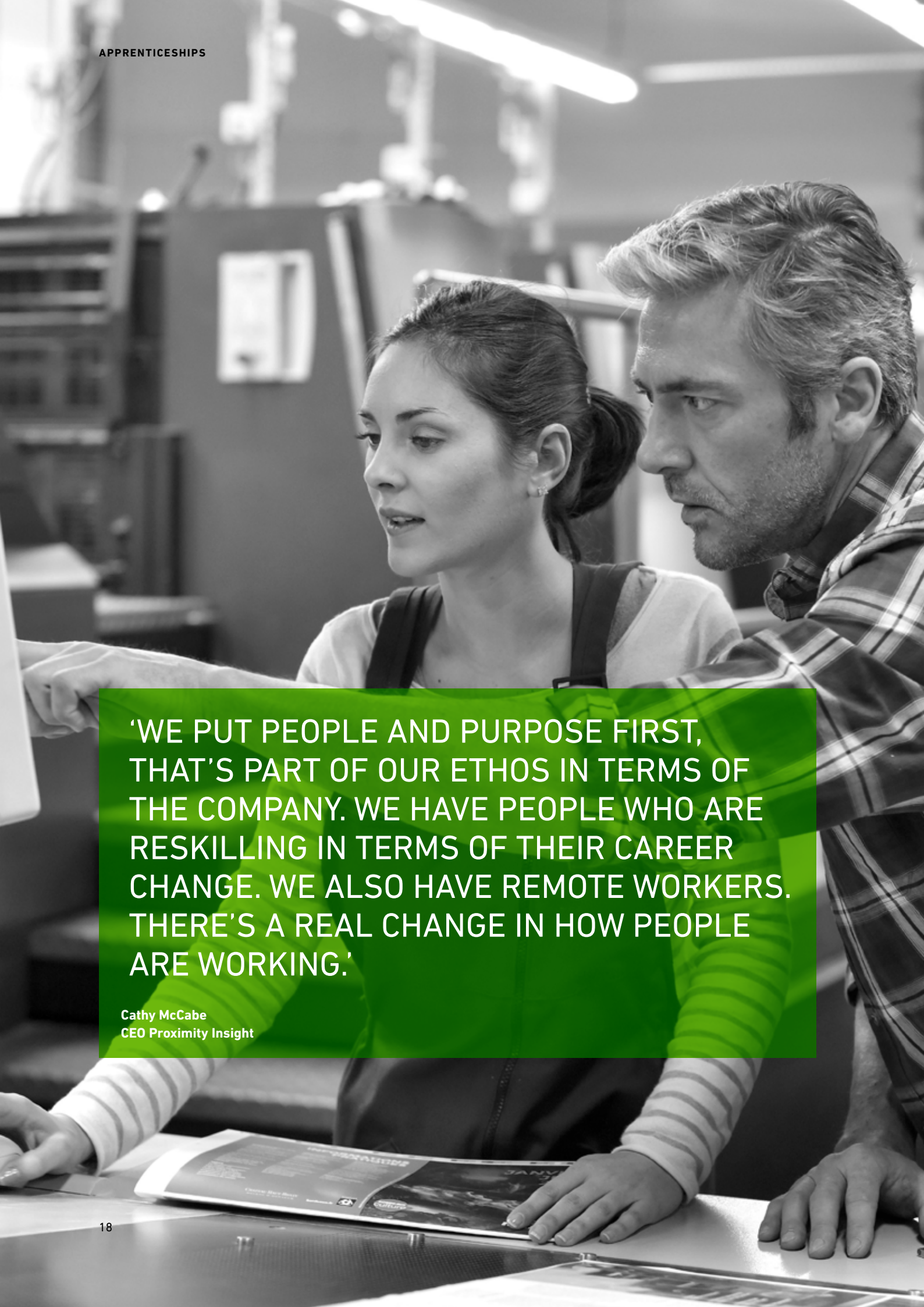
3. IT Leaders report – the survey was conducted online by BCS. A total of 366 respondents completed the survey during the period from 7 December 2018 to 14 January 2019. The survey targeted BCS members who are IT managers or directors, and others who contribute towards their organisation's strategic objectives. 69% of respondents were based in the UK.

4. AI survey – The survey was conducted online by BCS. Overall 417 respondents completed this questionnaire during the period 18 March to 15 April 2019. This represents a response rate of 4.8%. The survey was aimed at both decision-makers and those working in AI tech. The base for each pre-coded question is 417 unless otherwise indicated. 78% of respondents were based in the UK.

5. BCS Insights 2019 report – based on BCS analysis of ONS figures.

73%

OF EMPLOYERS SURVEYED STATED THAT IT IS IMPORTANT TO THEIR ORGANISATION THAT AN INDIVIDUAL APPEARS ON A PROFESSIONAL REGISTER OF COMPETENCE.[1]



‘WE PUT PEOPLE AND PURPOSE FIRST, THAT’S PART OF OUR ETHOS IN TERMS OF THE COMPANY. WE HAVE PEOPLE WHO ARE RESKILLING IN TERMS OF THEIR CAREER CHANGE. WE ALSO HAVE REMOTE WORKERS. THERE’S A REAL CHANGE IN HOW PEOPLE ARE WORKING.’

Cathy McCabe
CEO Proximity Insight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4 June 2020, The Crystal, London
Hot on the heels of the phenomenal Insights 2019 conference, we're returning to The Crystal in 2020 with more motivational speakers and stimulating debate.
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We'll be exploring the true cost of personal responsibility and the difference it can make – for you, your business and the planet.
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