BCS Virtual Insights 2020

CONTENTS

INTRODUCTION

In 2019, we debuted a highly successful new event — BCS Insights — designed to give a platform for interesting and provocative thinking relating to technology and to showcase our research insights. For 2020, this has gone virtual. Events in the world have dictated this, of course, but have also provided an opportunity to more fully appreciate some previously unheralded professions. As you would expect, BCS has championed, through the #vITalworkers campaign, the key role IT professionals have held in keeping society working to the extent possible during the pandemic, in keeping people entertained, in supporting essential services and more.

The pandemic has thrown into ever starker relief the issues we face in making IT good for society. So, whilst shouting out the great things we've seen, we want to continue to call out where improvement is needed, identify what needs to be more closely analysed and take a role in addressing those issues. BCS Insights will once again be looking at a range of these issues: the importance of professionalism in the IT workforce and how it benefits society, the vital need for diversity at all levels — from development teams to leadership, the role of ethical behaviour and how we deal with the pace of change.

This document is designed to whet the appetite — taking a high-level view of the research we have undertaken over the last year. The numbers and comments we get from members reflects the views of those actually working in our industry. It gives a snapshot of the concerns in IT leadership, the diversity issues, mental health in IT and the role of specific world-changing approaches such as AI.

Paul Fletcher
CEO. BCS, The Chartered Institute for IT

BCS is a convener of thought. It's a place where people can have their views aired on the exciting tech developments we are seeing. And it is an engine — driven by expert members — for change.
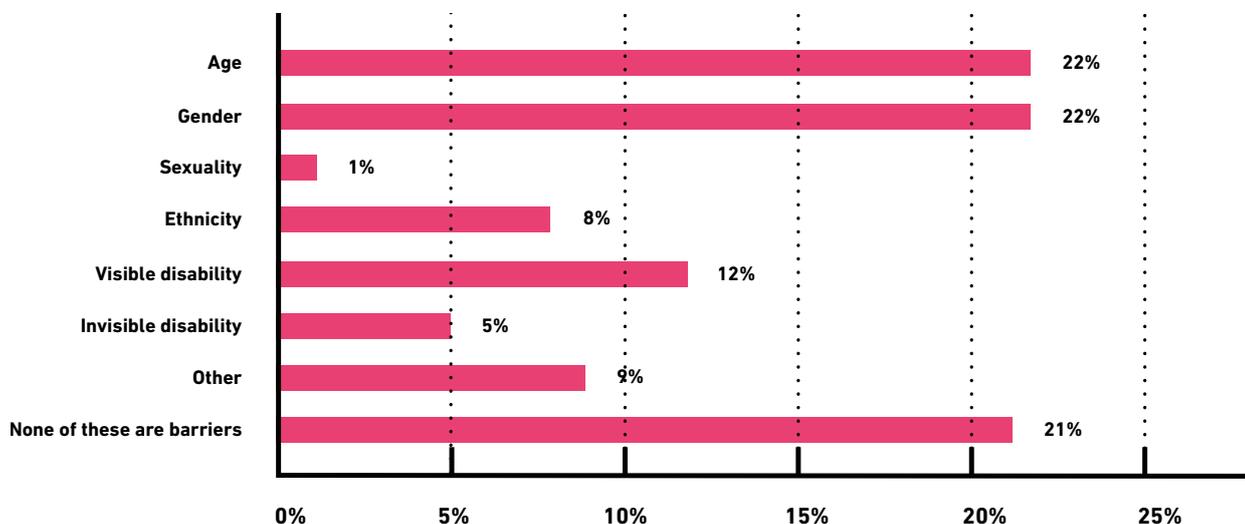
DIVERSITY & DISABILITY

For the last seven years BCS has asked its members about diversity — evolving from gender-related questions in conjunction with BCSWomen in previous years and now broadening out to cover age, disability and ethnicity as well. At the same time, we undertake an analysis of the ONS figures from government. Let's start with the BCS findings.

As is to be, unfortunately, expected, the topline BCS results do not make for rosy reading. Only 13% of respondents consider that their organisation makes it a high priority to have a diverse team, with 31% feeling it is relegated to a low priority status. That perception does not fit very well with the well-known benefits of developing with diverse teams — also reflected in this survey — where 49% considered that teams who lacked diversity would build AI applications with biased decision-making (only 14% thought this wasn't a problem).

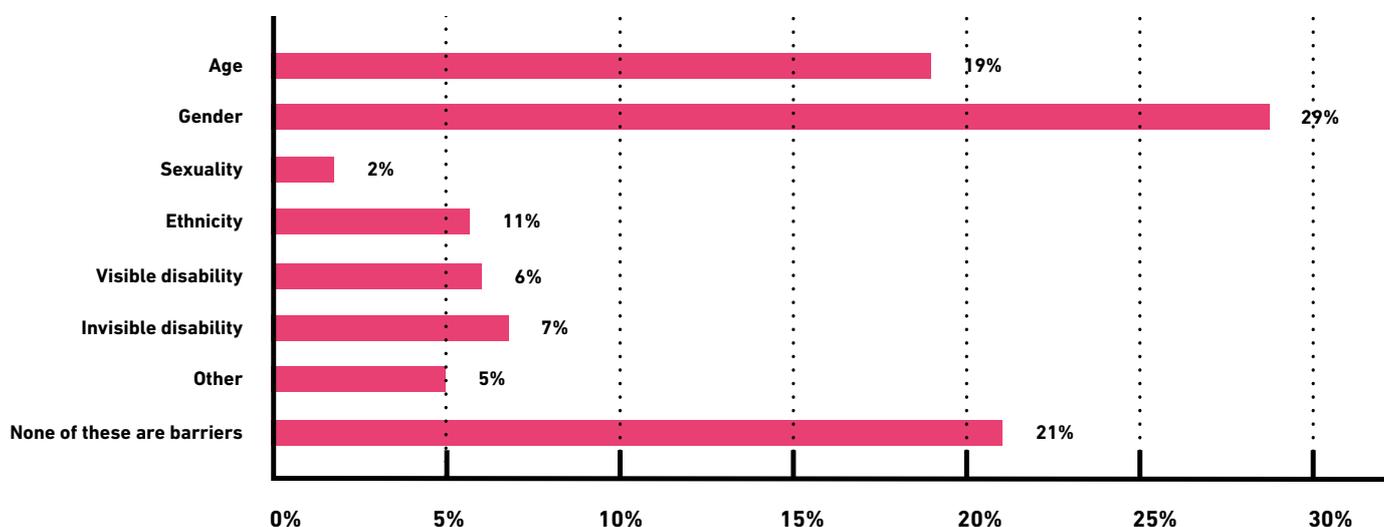The rating of the barriers to getting a first job/ progressing in a job are seen below:

IN YOUR VIEW, WHICH OF THESE, IF ANY, IS THE BIGGEST DIVERSITY BARRIER TO GETTING A FIRST JOB IN IT?

Category	Percentage
Age	22%
Gender	22%
Sexuality	1%
Ethnicity	8%
Visible disability	12%
Invisible disability	5%
Other	9%
None of these are barriers	21%

Source: BCS

IN YOUR VIEW, WHICH OF THESE, IF ANY, IS THE BIGGEST DIVERSITY BARRIER TO PROGRESSING A CAREER IN IT (I.E. PROMOTION)?

Category	Percentage
Age	19%
Gender	29%
Sexuality	2%
Ethnicity	11%
Visible disability	6%
Invisible disability	7%
Other	5%
None of these are barriers	21%

Source: BCS

Gender and age are perceived to be the main diversity barriers to getting a first job in IT, but when it comes to progressing a career, gender comes out as a clear leader.

Worryingly, 36% of respondents consider themselves to have been the victim of prejudice or discrimination in their workplace in the last 12 months. When taken with the fact that a full third of respondents have received no diversity training of any kind, that is maybe unsurprising. And, when looking from the outside in, 44% consider that they have witnessed another person as a victim.

WHICH GROUPS ARE MOST AT RISK OF BIAS WITH NON-DIVERSE DEVELOPMENT TEAMS?

As BCS always does, we asked several questions requiring verbatim answers. Whilst not, by definition, quantitative, these questions are a good way to see some of the feeling behind the numbers.

Some answers to the above question were what would certainly be expected — that anybody other than reasonably affluent white males, with higher education and often connected to so-called tech bro culture would probably be at a disadvantage with non-diverse teams.

And there were some nicely turned expressions that could function as rules of thumb when doing development work: 'those not in the room,' for example, is a good catch-all principle. An interesting nuance on that was this remark: 'the minorities in the AI development location (may suffer from lack of representation) because we know there are more foreign cultures in London than Chester, for example, so the likelihood of bias in London will be lesser.'

And taking the discussion into a broader realm is this answer: 'anyone whose philosophical beliefs might affect their use or interpretation of a solution.'

THINK

'I VISITED AN ORGANISATION WHERE A SENIOR RESEARCH MANAGER LIVED WITH TOURETTE'S SYNDROME. HE EXPLAINED HIS CONDITION AT THE BEGINNING OF OUR MEETING — IN A PURELY FACTUAL AND NON-APOLOGETIC WAY — AND THEN THE MEETING PROCEEDED PERFECTLY NORMALLY, WITH NO-ONE ACTUALLY NOTICING THE MANIFESTATIONS OF HIS CONDITION. IT WAS REALLY HEARTENING.'

One member writes: 'anyone with a chronic health condition knows how important it is to explain very precisely to a doctor what issue you are currently facing and what has changed recently; otherwise they'll focus on your chronic condition and effectively deny you treatment.

'An opaque AI system won't have such an interface to let you make such subtle distinctions by default. The effect will be to deny a lot of people with chronic conditions healthcare for anything but their chronic condition.

'Any context that today requires you to make a careful, sequential explanation to another human being has a risk of just being denied without rationale by a non-diverse AI team.'

8%
OF IT DIRECTORS ARE DISABLED (DDA DEFINITION)

As always, there are considerations far beyond the specificities of code — for example, what happens to people's representation if English is their second language? One responder also said this: 'Simple stuff! I didn't believe it when I read that Alexa was tested largely on male voices, but if she doesn't respond the first time I lower my voice a couple of tones and "hey presto!"'

In developing applications for certain groups, experience of the issue being addressed was noted as being important — along with its attendant complexity. What if there is a lack of sufferers of chronic health conditions on teams building medical AIs, for example?
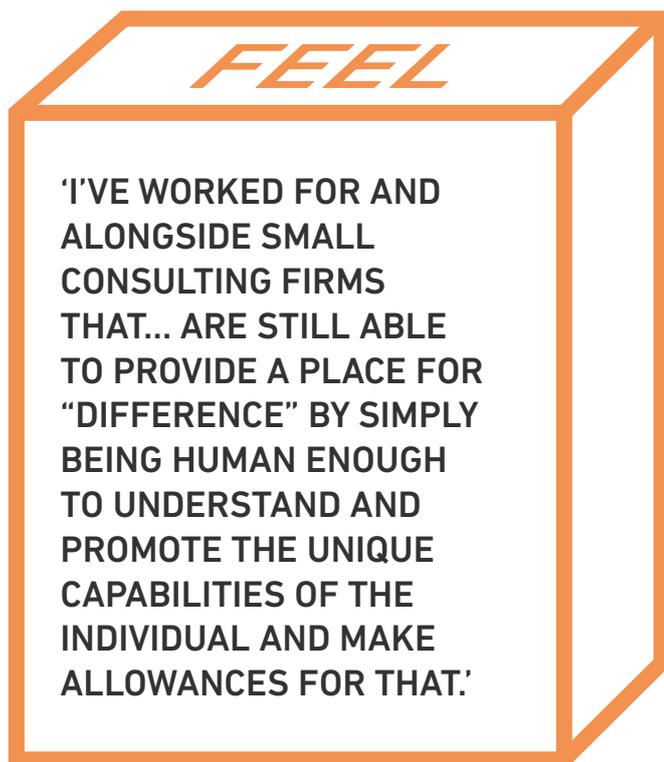
THE BENEFITS OF DIVERSE TEAMS

To take the more positive angle, we also asked members to talk about the benefits of diverse teams. Inherent in some of those answers is an expectation that we start from some awareness of team limitations. For example, one member talks of 'broad life experience, specialist knowledge of cultural experience.' This member goes on to suggest that we need to find ways of exposing biases much closer to the 'creation of an app, rather than persisting till testing. This is about the importance of noticing unstated assumptions.'

As another respondent points out: 'there are so many other points of view that need incorporating that the current developer profile will seldom think of.'

Clearly this is no easy task, with some of the view that getting a fully diverse team is almost impossible without, as one respondent said, diversity being 'mandated with further mitigation of user testing within non-included groups. Unconscious bias is extremely difficult to identify and eradicate.'

Another commenter alludes to bias as a management style issue: 'bias also depends on the data that is being used for the training and the type of AI system. If the data is flawed or overtly directed by a single person or group of people the AI system will be flawed, regardless of the team dynamic.'

FEEL

'I'VE WORKED FOR AND ALONGSIDE SMALL CONSULTING FIRMS THAT... ARE STILL ABLE TO PROVIDE A PLACE FOR "DIFFERENCE" BY SIMPLY BEING HUMAN ENOUGH TO UNDERSTAND AND PROMOTE THE UNIQUE CAPABILITIES OF THE INDIVIDUAL AND MAKE ALLOWANCES FOR THAT.'

BCS recently interviewed Rupert MacNeil, the government's Chief People Officer, who looks after around 4,500 people in government HR. He has very robust views of the requirements for diversity in teams.

'Ten, 20, 30 years ahead, what type of people do we need, for example, to deal with the cyber environment with a backdrop of climate change and burgeoning automation?' he asked.

'Diversity in all its forms is good for decision-making. Some jobs are better done by certain neurotypes. In fact, I'd rather say it is a world of multiple neurotypes than that a person is neurotypical or non-neurotypical.

'Actively recruiting for people on the autism spectrum and not just in IT type roles but data analysis — is interesting for the working life of the UK.' McNeil also mentioned that at the civil service, they populate internships with certain neurotypes in mind. They also pursue such tactics as non-live video interviewing to enhance diverse applicant inputs.

As an interesting aside, McNeil mentioned that even very basic issues, such as office environment, can either help or hinder diversity efforts. He discussed lighting, temperature, oxygen levels, ambient noise, environmental colour choices. Here it can get somewhat complicated — some people need low noise visual environments, wherease those with early stage Alzheimer's, for example, may need more visual cues. As McNeil said: 'this makes HR an interesting and challenging area.'

BCS President Rebecca George draws attention to the ongoing difficulty in attaining something approaching gender balance in IT roles. 'In discussing what can be done in a practical sense', she commented, 'I've been working to promote women in IT now since the mid-1990s. We have made progress, there's no question. But it is snail-like in its progress. I still think it's multi-faceted. There's still more to do to make the curriculum more inspirational to girls but also to enable girls to participate more fully in the classroom. There's more to do around role models so that girls can see successful women in the IT industry and in the other STEM industries and aspire to those sorts of jobs.

'There's more to do, not possibly at the apprentice or graduate recruitment stages of peoples' careers — I know from my practical experience that we and our clients do well with ethnic minorities and women in early years of careers — but we don't do well enough at retaining those people through the middle years of their career and into the senior levels. I think some sort of more radical approach is probably required.'

TIPS FOR IMPROVING DIVERSITY

With the problems well publicised, what can be done practically at a large scale? The following are suggestions from survey respondents:

- 'Measure your diversity progress.'
- 'It's about training: do not always hire people who are currently experts or have the correct experience, this continues the homogeneity.'
- 'Pursue a philosophy that accepts that experience does not equal ability.'
- 'Collect work-based data on diversity measures to create an evidence base for improvement.'
- 'Record your case studies, both to show how pervasive unconscious bias is, how it works against equality of opportunity and also to show examples of where conscious welcoming of diversity has improved outcomes.'
- 'Embed diversity training in all roles and inclusiveness training in line with the Equality Act.'
- 'Encourage the idea that a tech career is for anyone.'
- 'Take personal responsibility: call out and address bias in others.'
- 'Try reverse mentoring.'
- 'Anonymise CV and application profiles.'
- 'Champion meritocracy over favouritism.'

Some members gave longer views encompassing some of these issues. For example, with the underlying message of educating ourselves on how some people may be affected by things not relevant to job performance, one member writes, 'Maybe some older people have fallen behind technology or practice, but others haven't. It's the currency that matters, not the age. Encourage consideration of diversity in team-building and social activities.

'My experience is that these have been universally loud and brash (bad for those on the autism spectrum) and have centred around alcohol (bad for those who cannot, or choose not to, drink).

DO?

'PURSUE A PHILOSOPHY THAT ACCEPTS THAT EXPERIENCE DOES NOT EQUAL ABILITY.'
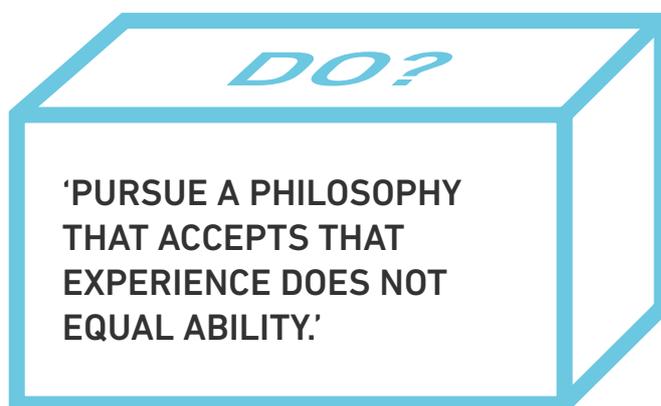
'Another example is the fashion for stand-up meetings — a challenge for those who cannot comfortably stand for long periods. Encourage practices that do not exclude those with hidden disabilities.'

In the same vein, is this simple advice: 'read Tomas Chamorro-Premuzic's book.'
'Address the real problem: ageism', writes another member, 'Stop all the nonsense about a STEM shortage — there isn't one. What there is, is a shortage of (cheap!) young graduates. Companies need to invest far, far more in their older workers, of all backgrounds, through more training.'

WITH YOUR CURRENT EMPLOYER, WHAT KIND OF DIVERSITY TRAINING HAVE YOU RECEIVED, IF ANY?

Category	Percentage
General equality and diversity	58%
Unconscious bias	41%
Other	8%
None	33%
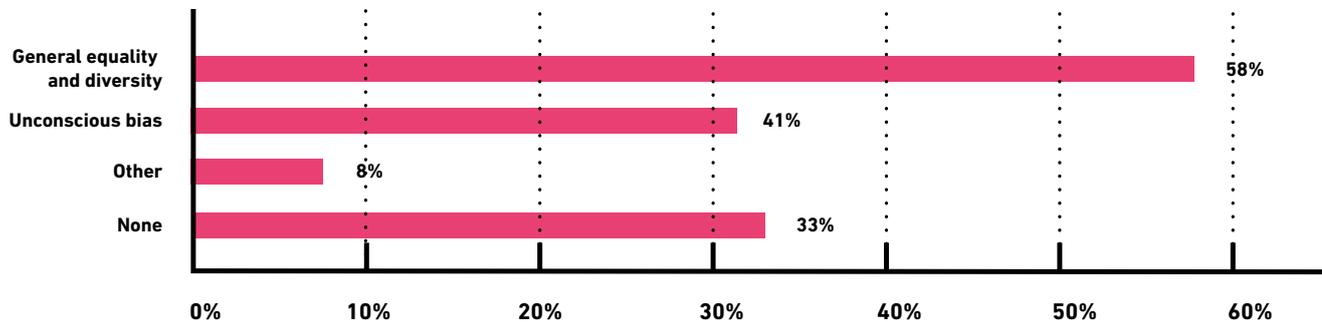
Source: BCS

SOME EXPERIENCES FROM ORGANISATIONS WITH GOOD INCLUSIVITY POLICIES

Some members related interesting and positive personal experiences. 'One small group at an organisation with more than 28,000 staff hired someone to come in and perform a secret shopper style review of their interview and engagement processes,' writes one.

Another discusses being interviewed by three women for a job. 'Novel and the best interview experience — not intimidating but more of a conversation,' writes the member.

41%
HAVE RECEIVED UNCONSCIOUS BIAS TRAINING

'I recommend the government success profiles,' said one member, 'it helped me get my next job! The application process was time consuming but allowed me to be assessed based on my experience in areas essential to the role, rather than someone making judgement based on my CV.'

'I visited an organisation where a senior research manager lived with Tourette's syndrome,' wrote another. 'He explained his condition at the beginning of our meeting — in a purely factual and non-apologetic way — and then the meeting proceeded perfectly normally, with no-one actually noticing the manifestations of his condition. It was really heartening.'

'I worked for one of the largest software vendors on the planet and they had many practical means to engage with diverse groups for the purposes of inclusivity,' writes another responder. 'This includes a lady I worked with being appointed as a champion for minority groups in the local region and having entire conferences around diversity and inclusion, not to mention focused strategies.

'I've also worked for and alongside small consulting firms that, even without those resources, are still able to provide a place for "difference" by simply being human enough to understand and promote the unique capabilities of the individual and make allowances for that. It came down to experiential relationships — i.e. relations that are based on intimate shared experience over time.

'I now work privately for my own small firm and one of the best compliments I received was a young Arab Muslim IT consultant I had worked with for some time asking me if he could pray in a corner of the room, while I was there. As a white Christian south african male who assented without the slightest hesitation, I was glad he felt free enough to do so.'

GOOD INCLUSIVITY

BCS asked for examples of good workplace inclusivity. Responses included:

- 'Create workplace groups to represent different groups, Yammer groups.'
- 'Provide breastfeeding rooms.'
- 'Use an external agency to de-bias recruitment ads.'
- 'Appoint an inclusion officer.'
- 'Make resources available for different groups, endorsed and encouraged by management.'
- 'Undertake name-blind recruiting.'
- 'Encourage autism awareness training.'
- 'Implement location-neutral policies.'

33%
HAVE RECEIVED NO DIVERSITY TRAINING

WORK CULTURE

- 'We need flexible working, remote working, shorter hours, job sharing, better diversity and unconscious bias training, better support for staff (especially for staff retention), reduction in support for contract culture, visible push back on lad culture, visible push back on xenophobia (especially given the increase since Brexit, not just against non-Caucasians, but against Europeans in general). Stop putting the focus on getting more diversity in and do something about the phenomenal attrition rates. (You don't really expect women to advocate for more women when those in the industry are getting battered).'

- 'I previously worked in a very male-dominated environment with lots of prejudice, particularly around parenthood but also about gender. My current employer has high level female management and it makes a big difference to attracting new staff. However, the overall attitude is also much better for everyone. Based on my experience, representation matters at a high level of management to attract the next generation along.'

- 'Unionise. Engineers need to do the right thing and take responsibility for their actions, but when they say "no" they also need someone who will stand behind them and support them.'

- 'My workplace is great for people with family commitments — there's a strong precedent of people taking time off and working funny hours around childcare and other dependencies and a culture of supporting each other. Precedents were set by the founders early on and it's stuck. Also, we're a fully remote organisation so everyone works from home, which is great for balancing work with family commitments!'

- 'One manager I have been mentored by ensures that he checks with all attendees to meetings that they have no additional requirements. It led him to have all his team meetings by web conference and everyone has their face on screen because one team member is deaf and lip reads. This is something that is now being taken up by the company and they support this being the meeting type of choice to ensure more people are included in the meetings properly.'

'MY CURRENT EMPLOYER HAS HIGH LEVEL FEMALE MANAGEMENT AND IT MAKES A BIG DIFFERENCE TO ATTRACTING NEW STAFF.'

- 'What would help? Flexible working, no dress code, independent HR complaint services, contracts that do not contain clauses that impose secrecy.'

- 'My management informed coworkers of an employee undergoing gender transition, in a sensitive way coordinated with the employee. Management routinely advised all staff of the start of Ramadan, reminding us to be sensitive to those fasting.'
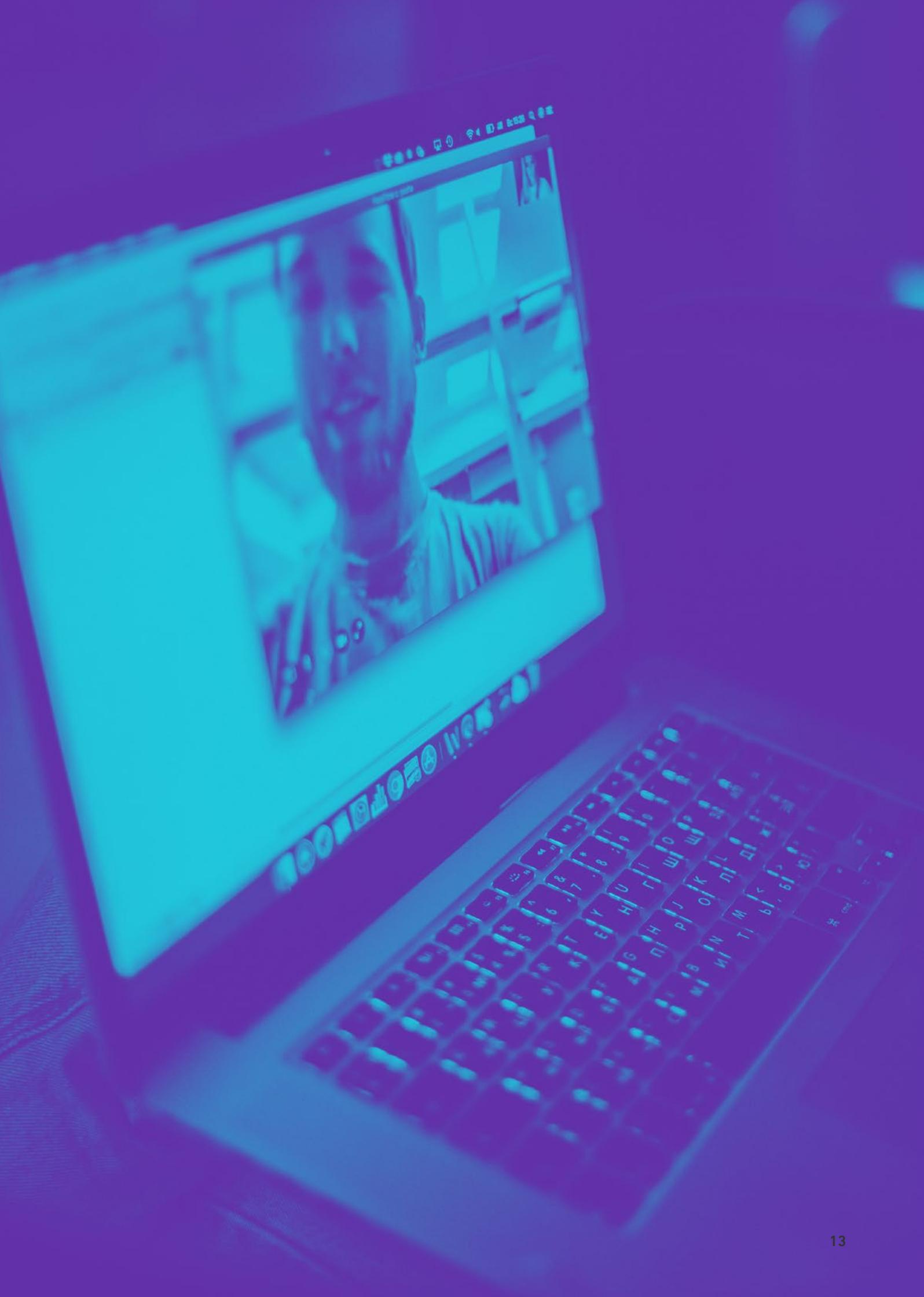
KEY ONS FINDINGS, GENDER

- Women accounted for 50% of the working age population in 2019 (those aged 16-64), 48% of those in work and 45% of the unemployed.
- There were 249,000 female IT specialists in the UK workforce during 2019 — 17% of the total at that time.

3.1%
UNEMPLOYMENT RATE FOR FEMALE IT SPECIALISTS OVER 2019 — NOTABLY HIGHER THAN THAT FOR MALE IT SPECIALISTS (1.2%)

- The level of female representation in IT varies by nation/region but even at its highest in Wales, women accounted for just 21% of IT specialists.
- By occupation, representation of women varied from around one in twenty (4%) for IT / telecoms engineers — to around one in three (31%) amongst IT operations technicians.
- The unemployment rate for female IT specialists over 2019 was just 3.1% — notably higher than that for male IT specialists (1.2%) but less than the overall rate for the UK labour market (3.9%).

- Female IT specialists are more likely to be working at large business sites (those with 250 or more staff) than their male counterparts (i.e. 45% of female IT specialists and 41% of males).
- The gender balance for IT specialists was worse within the construction, manufacturing and IT sectors (within which women accounted for just 12%, 12% and 13% of IT specialists).
- Female IT specialists were four times more likely to be working part-time than males (i.e. 16% versus 4%) — though most often as they did not want full-time work.
- At £18 per hour, the median hourly earnings for female IT specialists in 2019 was 14% less than that recorded for males working in IT positions (full-time employees).
- Female IT specialists are marginally more highly qualified than their male counterparts and in 2019, more than seven in ten (71%) held a degree or other HE level qualification.
- Female IT specialists were more than three times less likely than males to hold an IT degree (4% compared with 13%).
- Female IT specialists are notably less likely to obtain employment through the use of agencies or in-company contacts.

KEY ONS FINDINGS, AGE

- Individuals aged 50 and above accounted for 31% of the working age population in 2019 (those aged 16-64), 29% of those in work and 20% of the unemployed.

- Representation of these 'older workers' was much lower amongst IT specialists and of the 1.5m people working in such roles in 2019, only 22% (318,000) were aged 50 and above.

- If representation was the same as within the workforce as a whole (i.e. 29%), there would be 114,000 additional IT specialists in the UK aged 50 and above.

- Across the UK, representation of older people in IT positions was lowest in London where just 15% were aged 50 and above during 2019.

- Only around one in ten web designers/ developers are aged 50 and above (10%) but amongst IT directors, more than one quarter are of this age (28%).

- In 2018, there were estimated to be 7,000 unemployed IT specialists in the UK aged 50 and over — equating to an unemployment rate of 2.3%.

- Older IT specialist were more likely to be working on a self-employed basis than their younger counterparts (16% versus 10%) and were also more likely to be working part-time (10% versus 4%).

22%
IT SPECIALISTS AGED 50 AND ABOVE

- The median hourly earnings for older IT specialists in 2019 was £24 per hour — 17% more than that for IT specialists as a whole.

- Older IT specialists are notably more likely to hold 'responsible positions' — almost half (49%) having managerial/supervisory status in their job (compared with 39% of younger IT specialists).

- Older IT specialists are less likely to have an HE qualification and in 2018, only 63% of those aged 50 and had a qualification at this level compared with 71% of those aged 16-49.

- Younger IT specialists are also much more likely to hold an IT degree than those aged 50 and above.

- Older IT specialists are notably less likely to obtain employment through direct applications or recruitment agencies than others but more likely to gain employment through contacts within the employer organisation.

KEY ONS FINDINGS, DISABILITY

- Though accounting for 19% of the working age population, people with disabilities constituted only 13% of the total UK workforce in 2018.
- There were 157,000 IT specialists in the UK with disabilities in 2019 — 11% of all IT specialists in the UK at that time.
- If representation was raised to the level seen for all workers this would equate to an extra 37,000 IT specialists in the workforce.
- Representation varies across the UK and during 2019 period, it was noted that just 7% of IT specialists in London were disabled.
- Representation of people with disabilities also varies within IT roles and in 2019, just 8% of IT Directors were disabled.
- Over the 2017-19 period, approximately 15% of all unemployed IT specialists in the UK were with disabilities (4,000 in total) and the associated unemployment rate (2.1%) was notably higher than that recorded for IT specialists as a whole (1.5%).
- Representation of IT specialists with disabilities is lowest amongst the construction sector at just 8%.

- The median hourly earnings of IT specialists with/without disabilities in 2019 was £19phr — 10% less than those without disabilities.
- Though highly educated, disabled IT specialists were less likely to have a higher-level qualification than IT specialists that were not disabled (66% vs 69% respectively).
- IT specialists with disabilities are also less likely to hold a degree in an IT related discipline than others working in such occupations (14% compared with 16% without disabilities).
- IT specialists with disabilities were more likely to receive job-related education/training in 2019 (30% stating that education/training had been received in the previous 13 weeks compared with 22% of those without disabilities).
- Disabled IT specialists are notably less likely to gain work via 'in company' contacts than those without disabilities (14% versus 17% stating that they had gained work in this way during the 2015-19 period).

157,000
IT SPECIALISTS IN THE UK WITH DISABILITIES IN 2019

KEY ONS FINDINGS, ETHNICITY

- Individuals from BAME (Black, Asian and Minority Ethnic) groups accounted for 14% of the working age population in 2019 but only 12% of those in work and 22% of the unemployed.

- At 18%, BAME representation was higher amongst IT specialists than within the workforce as a whole (12%) in 2018 and in total there were 268,000 BAME IT specialists in the UK at that time.

- BAME representation amongst IT specialists varies significantly across the UK — from just 4% in the South West of England to 33% in London.

- BAME representation amongst IT specialists in 2019 ranged from just 9% of IT directors and web designers / developers — to 26% of business analysts.

- There were approximately 7,000 unemployed IT specialists from BAME ethnic groups in the UK during 2019 — 30% of all unemployed IT specialists in the UK at that time.

- BAME IT specialists were marginally more likely to be self-employed than others during 2019 (12% compared with 11% of those from white ethnic groups).

- Just under one half (49%) of all BAME IT specialists were working in IT businesses in 2019 — a higher proportion than for those of white ethnic origin (44%) and IT specialists as a whole (45%).

- BAME representation was lowest within the manufacturing sector where just 8% of IT specialists were from BAME ethnic groups.

- In 2019, BAME IT specialists (full-time employees) were earning the same as IT specialists as a whole with median hourly rates in each case of £21 per hour.

- BAME IT specialists are less likely to be in 'positions of responsibility' than those of white ethnicity with 32% and 43% respectively, stating that they were a manger/foreman or team leader in 2019.

- Almost nine in ten BAME IT specialists have an HE level qualification (85%) compared with less than seven in ten (66%) of those from white ethnic groups.

18%
OF IT SPECIALISTS ARE FROM BAME GROUPS — HIGHER THAN WITHIN THE WORKFORCE AS A WHOLE (12%)

- BAME IT specialists are much less likely than others to find employment from contacts in post (10% compared with 18% of white IT specialists over the 2015–19 period).

IT LEADERS

IT Leaders 2020 lifts the lid on the pressures, decisions and future possibilities that are occupying technology leaders' minds.

BCS has been collating the IT Leaders Report (previously called the Digital Leaders Report) since 2014. The questions we ask and the data points we sample have, in the main, remained consistent — though there have been tweaks and changes over the years. Despite these slight shifts, the body of reports taken together provides a longitudinal view of how IT provision has changed over the past six years.

As you read on, we'll explore some of this year's key findings, set them against data from previous years and see if we can uncover any revealing patterns and trends.

BCS members can download the full report by logging into MyBCS, the members' area of the BCS website. When there, head over to the Knowledge and Resources tab and select the Digital Leader research option.

TOP PRIORITIES FOR 2020

This year, the IT Leaders Report found that the number one priority for 2020 will be business transformation and organisational change (21%). This has remained consistent since 2018. The question is, why?

The answer can be found by looking a few steps down the list of top priorities, where you'll find 'continuous innovation' and 'maintaining competitive advantage' riding high among the top priorities. Again, these priorities are regular top scorers in our research.

THINK

'WE HAVE A GAP IN IMPLEMENTING SUCCESSFUL AGILE PRINCIPLES IN MANAGING PROJECTS AND DEVELOPMENT OF FIT-FOR-PURPOSE IT SOLUTIONS FOR OUR CUSTOMERS.'

These three factors — transformation (21%), innovation (15%) and maintaining competitive advantages (16%) — are all forces that act on a business and they are all driven, largely, by the same engine: customer expectation. Outside an organisation's walls are legions of customers, all with evolving needs and changing interaction preferences. Brands need to be always on, always listening and always ready to respond.

These demand-side factors create the need, inside organisations, for enhanced and evolving technical, operational and cultural infrastructure. In order to meet their business objectives, organisations need flexible operating models. As we shall see, this need for flexibility is a recurring theme in our 2020 findings.

CHANGING PRIORITIES

The technologies that organisations are prioritising for 2020 are cyber security (52%), cloud (also 52%), IT governance (36%), automation (32%), and SaaS, PaaS, Iaas, x-aaS / as-a-service model / everything-as-a-service (31%). When asked to identify their top priority, cyber security (18%) edged ahead of cloud (16%).

Looking back across three previous years' results, we can see a distinct pattern: cyber security generally weighs in as organisations' number one priority and cloud comes in as the second most pressing topic. But, as always, there are other stories in the data.

CYBER SECURITY IN FOCUS

Glance back through 2019's news headlines and the reasons for cyber security's dominance as a number one priority becomes abundantly clear: in June 2019, Quest Diagnostics — a US lab testing company — saw data about 11.9 million customers fall into hackers' hands. The breach exposed financial, personal and medical records.

In July, criminals gained access to around 100 million Capital One customer records. Here, digital thieves made off with personal and financial details. Later in the year, Zynga, a game producer, experienced a hack that cost it the details of about 218 million customers.

On New Year's Eve, hackers attacked Travelex's infrastructure and network. The criminals launched a ransomware attack that brought the foreign exchange firm's computers to their knees. Across the globe — from Europe to Asia and the US — Travelex was reduced to using pens and paper to process currency transactions. The ransomware gang responsible demanded nearly five million dollars to free up the company's systems.

The attacks mentioned here are, of course, some of 2019's biggest. Behind the headlines, at a local level, small and medium-size organisations fend off fraud and cyber attacks on an almost daily basis.

Beyond direct financial losses, cyber attacks also pose reputational and regulatory risks for organisations. Little wonder cyber security also ranks very highly among the factors that keep respondents awake at night — a topic we'll explore elsewhere.

52%
OF ORGANSISATIONS ARE PRIORITISING CLOUD AND SECURITY

MOVING TO THE CLOUD

Though cyber security dominates the agenda as organisations' number one priority for 2020 (18%), cloud comes in a very close second (at 16%).

When it comes to start-ups, smaller organisations, or for new services (the deliverables often called for as part of a transformation project), cloud's pay-as-you-go model works particularly well. Why purchase physical hardware, space in a data centre and all the necessary support when you can simply rent what you need? And what's more, scale up quickly if the product or services gain traction.

Cloud's attractiveness is further bolstered when you consider that enterprises who own and maintain their own infrastructure need to buy more compute and storage than is really necessary. Demand, particularly for online shops, is very spiky: the server load during a dull February day is likely to be many times lower than that on Black Friday. As such, organisations can carry up to five times more compute and storage power than they need so they can meet peak demand. Commonly, this also means that enterprise might only use 10% of their bought, paid for and maintained physical infrastructure (**https://bit.ly/37qXjPm**).

Cloud also offers enhanced flexibility. On the technical side, adding compute and storage capacity is likely just a matter of making a request to a supplier. Cloud's ability to provide agility also resides in how it's paid for. Traditionally, enterprises have a longer planning and approval process for large capital expenditure programmes like buying IT infrastructure. By contrast, cloud with its pay-as-you-go model, is more likely to be part of an organisation's operating expenditure. So, agility, in the fixed infrastructure world, may be hampered by boardroom and financial due diligence.

Cloud is, then, the building block upon which many digital transformation projects are based. Evidence for this can be seen in 'organisational change' ranking as our respondents' number one organisational priority for 2020. As business strive to transform, they are — this report suggests — turning to cloud as an enabling technology. Transformation and cloud adoption march in lockstep.

10%
OF ORGANISATIONS PRIORITISE XAAS AS NUMBER THREE FOR 2020

The other part of the cloud story is the as-a-service model. Organisations don't just rent storage and processing power, they rent software (SaaS). We also have platform as a service (PaaS), infrastructure as a service (Iaas) and many more permutations. XaaS is a term that refers to renting anything as a service. It encompasses the vast number of products, tools and technologies that vendors now deliver to users as a service over a network — typically the internet. Again, underscoring organisations' desire to transform and keep pace, we can see that XaaS weighs in as organisations' number three priority for 2020 (10%).

Looking at the data in our report and by taking cloud and XaaS adoption together, it's reasonable to conclude that organisations are keen to leave behind ownership and all that entails. Again, it is reasonable to conclude that the drive for this is business transformation and organisational change.
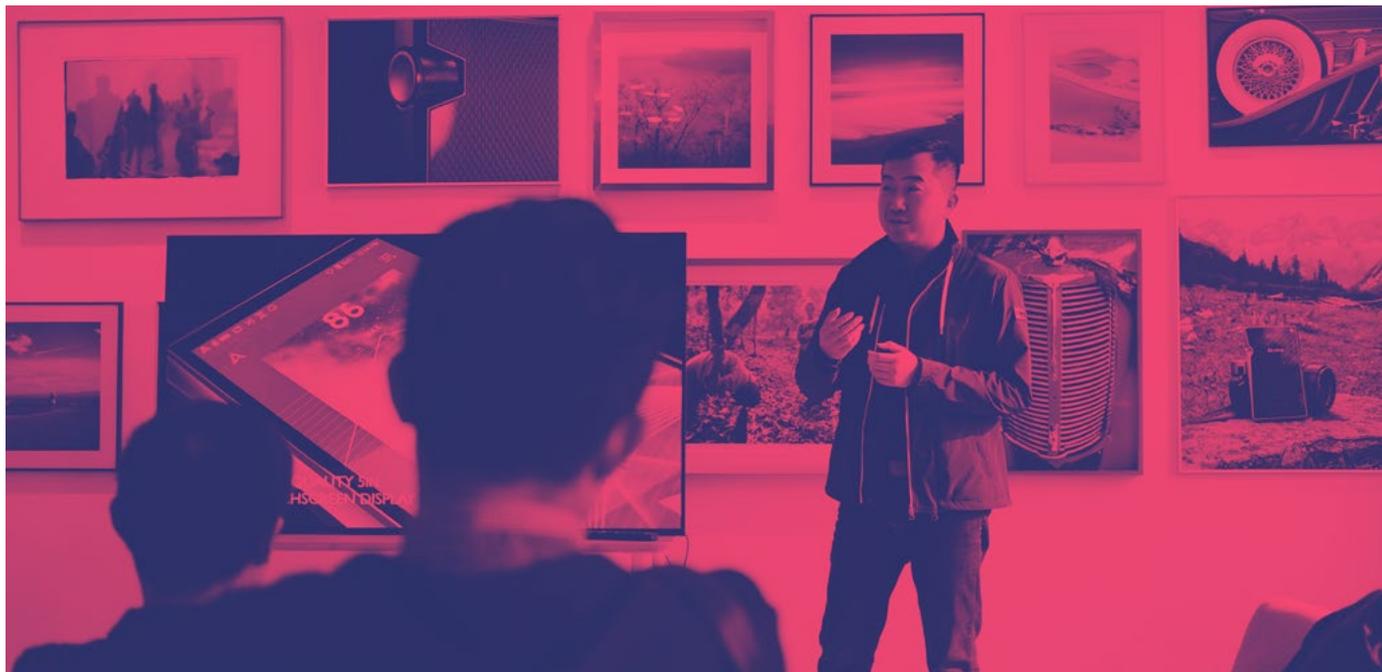
THE BREXIT EFFECT

BCS takes a neutral stance on Brexit. We are an impartial and apolitical organisation and, as such, have not — and will not — comment on the rights and wrongs of leaving the European Union. We are, however, keen to discuss, debate and explore what this separation will mean for the technical and professional landscape.

Looking at the last three years of BCS data about priorities, reported concern specifically about Brexit peaked in our 2019 report (5%) and fell back to 3% (2020). This is despite the political and news landscapes being largely dominated by Brexit.

Our report data might then suggest that technical leaders are spending less time thinking about Brexit and focusing their time and efforts on concerns such as infrastructure, strategy, resourcing and the like.

Indeed, take this 3% statistic (2020 report) in insolation and you could be forgiven for concluding that the Brexit story has resolved itself — at least in the eyes of tech leaders. That might not, however, be the whole story.

Glance again at the chart of organisations' number one priorities for 2020 and you'll see that 'operational efficiencies' has jumped in importance. In the 2018 and 2019 reports, 10% of tech leaders stated that operational efficiency was their number one priority. In the 2020 document, we see that this has increased to 17%; a significant jump.

What might be causing this drive for efficiency or, to put it another way: why might organisations need to do more with fewer resources?

The answer to this may well be uncertainty about Brexit. Business investment in the UK has, since Brexit began, trended downward. Indeed, companies' capital spending has shown its longest period of decline since the recession of 2003 (**https://on.ft.com/2NIA6k0**).

Capital spending, it should be noted, includes outlay by companies on things such as machinery, buildings, transport equipment and, last but not least, information technology. Our data suggests then, that organisations might be holding back on beginning projects and making investments that may pay dividends in the future. This slimming of capital expenditure may explain why technology leaders are reporting an increasing need to drive efficiency: IT leaders might be focusing on technology, while financial leaders are adopting a 'wait and see' approach.

Further proof that organisations are tightening their purse strings can be found in the 2019 and 2020 reports. In the 2019 document, we saw that 'enhanced IT capability and skills in existing workforce' was the number one additional resource needed by organisations (62%).

FEEL

'CYBER SECURITY IS ALWAYS A CHALLENGE AND IS THE SINGLE BIGGEST THREAT TO THE BUSINESS FROM AN IT PERSPECTIVE.'

In 2020, this story continued with 63% of respondents making the same observation. But behind the need for workers with better skills, we see 'increased budgets' jump from number three to number two in the list of additional resources needed for 2020.

2ND
THE RANKING FOR MORE FINANCIAL RESOURCES

Indeed, delve back as far as we can into the 2014 Digital Leaders report and we can see that 'increased budgets' has always followed 'enhanced skills' and 'additional suitably qualified staff' in organisations' resourcing wish list. To put it another way: historically, increased budgets have generally ranked as tech leader's third-biggest wish. Yet, in 2020, the desire for more financial resources became the number two need. This shift in the need for increased budgets in the 2020 report is significant when set against historical data.

A STORY OF TRANSFORMATION

At the very top level, the 2020 IT Leaders Report can be said to show that organisations are working hard to transform and keep pace with change. To meet this need to keep adapting, organisations are turning to cloud-based solutions and services. All this is underscored by a need to ensure the organisation remains secure.

UNDERSTANDING AI

Artificial intelligence is something of an umbrella term. We have narrow AI, general AI, reactive machines, limited memory systems, theory of mind and Hollywood's favourite: self-aware AI agents. Add in augmented intelligence and it becomes clear that AI isn't a one-size-fits-all term.

It is, however, a term and a technology very much worth discussion. In the 2020 IT Leaders Report, 21% of respondents said that AI was an organisational priority for the year. Add in automation (32%) and machine learning (17%) and a cumulative picture emerges: organisations are looking to use some kind of 'intelligent' system to help them achieve their business objectives. Just over half the respondents (53%) selected at least one of these three options.

To achieve some clarity on what AI means to businesses and how organisations are using it, the 2020 survey asked respondents about what AI meant, within the context of their business. Replies were open text and revealing and included:

- 'Planning ahead based on environment variables and historical statistics.'
- 'Analysing huge amounts of security-related data to speed response times and improve accuracy of detection.'
- 'General algorithms for intelligent matching for certain customer requirements.'

Taking a broad and general tally of opinions in the free text replies, most organisations — it appears — are using AI as a productivity tool where huge amounts of past data can be mined and conclusions used to influence future decisions: 'predictive analysis' as one respondent put it.

Again, broadly speaking, our survey reveals that a significant number of businesses are exploring the use of narrow AI to help them achieve their objectives through speeding up processes. We are, then, very much in the age of narrow AI — despite what salacious media headlines and sci-fi Hollywood might have us believe (or fear).

ADDITIONAL RESOURCED NEEDED

Category	Percentage
Enhanced IT capability in existing workforce	63%
Increased budget	45%
Additional employed IT staff	39%
Enhanced IT capability in leadership team	37%
Additional specialist contractors	32%
None - we have enough resourced	12%
Other	1%

Source: BCS

SKILLS FOR THE NEW DECADE

IMPACT ON THE PUBLIC TRUST IN IT

Use of personal data by organisations	25%	27%	19%	18%	9%
Management of large scale projects	4%	19%	38%	29%	8%
Cyber security	11%	22%	20%	23%	23%
Artificial intelligence	4%	16%	35%	30%	14%
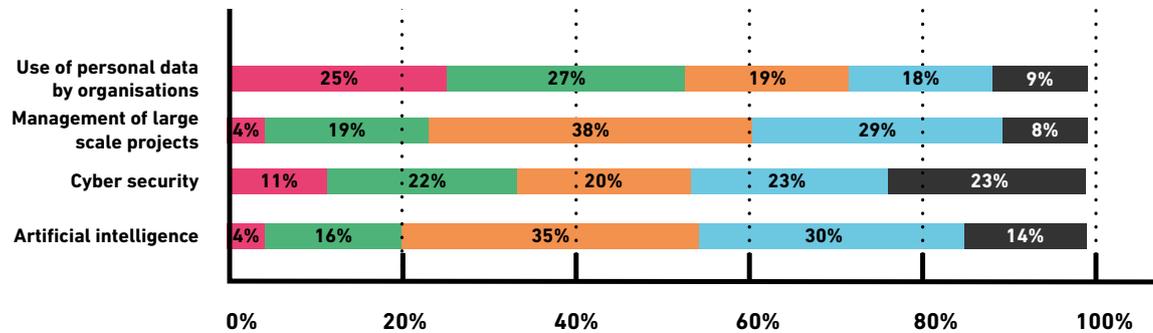
Source: BCS

The IT landscape is ever-changing. As this report shows, technologies, standards and approaches ascend and descend in popularity. As such, different talents, capabilities and skills are always in demand.

When it comes to meeting these new tech trends, enhanced IT skills among the existing workforce is rated as the top requirement in the 2020 report, with 63% rating this as their top resourcing need.

The need to upskill existing staff is a constant theme in previous IT Leaders Reports. Indeed, from 2014 onwards, we have seen leaders announce that enhanced skills among their existing workforce is their most pressing resourcing issue.

There are, of course, many ways in which organisations can enhance their workforce's IT skills. And this learning and development space is one where BCS is very active. We provide tools that enable organisations to understand and map the skills held within teams and departments, such as SFIA*plus*. BCS also offers professional certifications across specialisms such as Agile, DevOps, security, software testing and more.

63%
ENHANCED IT SKILLS AMONG THE EXISTING WORKFORCE IS RATED AS THE TOP REQUIREMENT IN THE 2020 REPORT

BCS' many member communities — both regional and discipline specific — all regularly hold events where members meet and share skills.

Along with upskilling existing staff, our body of IT Leaders Reports – taken together (2014-2020) — also shows that new and additional suitably qualified staff are always in demand. Dating back to the 2014 report, acquiring new staff with suitable qualifications has generally lagged marginally behind enhancing skills among existing workforce.
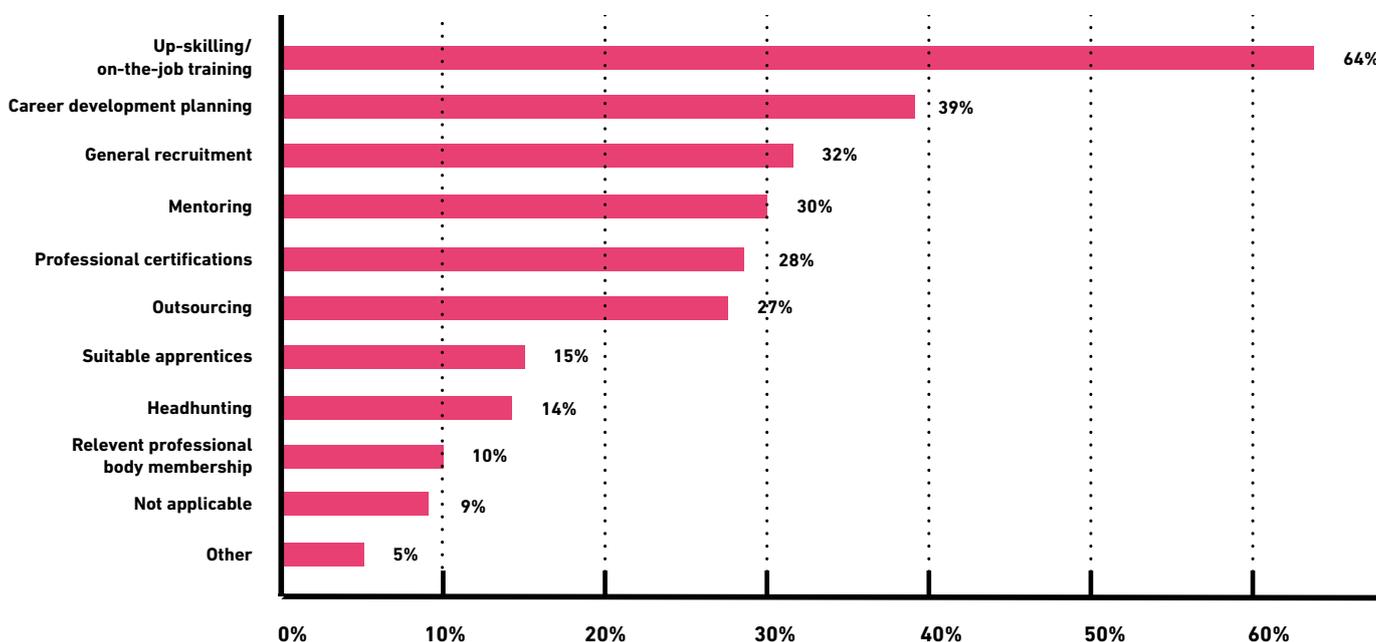
Take these two requirements together and we can quite safely conclude that the acquisition, maintenance and growth of a skilled and qualified IT workforce is a major resourcing challenge for organisations.

When it comes to capability gaps, the 2020 survey found that cloud, data and development skills were most in demand. Elsewhere in the 2020 report, we saw cloud rate very highly as a technology priority; so it would seem reasonable that, where demand for technology leads, the demand for talent follows.

To gain a further understanding of skills gaps, the 2020 survey took a qualitative approach, asking respondents for opinions, ideas and observations. Noteworthy observations were:

- 'A huge shortage of specialists with the right skill set(s) in AI and data analytics. This also extends into cyber.'
- 'Skills that match the pace of changing technology in all areas, ranging from network and telecommunication to applications development platforms and latest systems monitoring tools and performance tuning. We also have a gap in implementing successful agile principles in managing projects and development of fit-for-purpose IT solutions for our customers.'
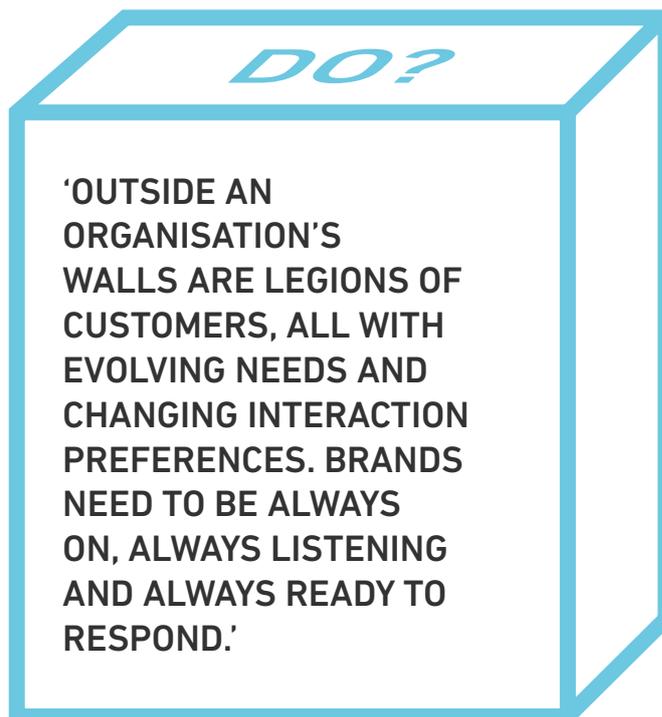
ADDRESSING THE SKILLS GAP

Category	Percentage
Up-skilling/on-the-job training	64%
Career development planning	39%
General recruitment	32%
Mentoring	30%
Professional certifications	28%
Outsourcing	27%
Suitable apprentices	15%
Headhunting	14%
Relevent professional body membership	10%
Not applicable	9%
Other	5%

Source: BCS

WHAT KEEPS US AWAKE AT NIGHT

Data about trends, corporate focus and operational needs is all well and good. It's useful insight when it comes to seeing trends and making decisions. However, it doesn't reveal much about what it feels like to be working on IT's front line. For this reason, each IT Leaders Survey asks: 'What keeps you awake at night?' Unsurprisingly, when looking at the results, most open text replies coalesce around cyber security. Revealing replies include:

- 'Security and privacy are becoming increasingly important for all SaaS companies dealing with customer data. Securing our ecosystem is going to be a competitive and necessary regulatory requirement that we need to embrace and deliver on.'

- 'Cyber security is always a challenge and is the single biggest threat to the business from an IT perspective.'

- 'Moving to the cloud. I can and want to keep things on premise. More than one provider is forcing me to the Cloud and I have no confidence in the stability of services offered, from both downtime and security perspectives.'

- And, simply, 'cloud security.'

10%
SELECTED PROFESSIONAL BODY MEMBERSHIP TO ADDRESS THE SKILLS GAP

DO?

'OUTSIDE AN ORGANISATION'S WALLS ARE LEGIONS OF CUSTOMERS, ALL WITH EVOLVING NEEDS AND CHANGING INTERACTION PREFERENCES. BRANDS NEED TO BE ALWAYS ON, ALWAYS LISTENING AND ALWAYS READY TO RESPOND.'

The above quotes show that, along with cyber security itself being a direct source of concern, respondents are also very aware that moving to the cloud doesn't obviate cyber security risks. Rather, it can produce cyber security concerns all on its own. Factors such as regulatory compliance, insecure APIs, human error, DDoS attacks against providers, insider risk and end-point security are all concerns when managing a cloud estate.

Other causes of sleepless nights linger around the idea of 'change' (more than the specific keyword 'change'). This is not surprising as elsewhere, our data shows that organisations are prioritising change and transformation and this cascades down into the fast-paced adoption of cloud technologies and services.

This need to change and transform may be placing undue pressure on IT staff.

KEY FINDINGS, IT LEADERS

- The priorities for 2020 are operational efficiencies (56%), continuous innovation (53%) and business transformation and organisational change (43%).

- When asked to single out their number one priority, the top answer is business transformation and organisational change, selected by 21% of respondents.

- The technologies that organisations are prioritising for 2020 are cyber security (52%), cloud (also 52%), IT governance (36%), automation (32%), as-a-service model (31%).

- When asked to identify their top priority, cyber security (18%) edged ahead of cloud (16%).

- Only 12% of participants feel their organisation has enough resources to achieve success in 2020.

18%
IDENTIFIED THEIR TOP PRIORITY AS CYBER SECURITY, EDGING AHEAD OF CLOUD (16%)

MENTAL HEALTH

Mental health is an ongoing conversation. BCS undertook this research at the end of 2019, pre the pandemic, which certainly adds another layer. Whilst a small piece of research, that gives a flavour of feelings more than definitive numbers, when put alongside BCS' analysis of ONS data, it makes for interesting reading.
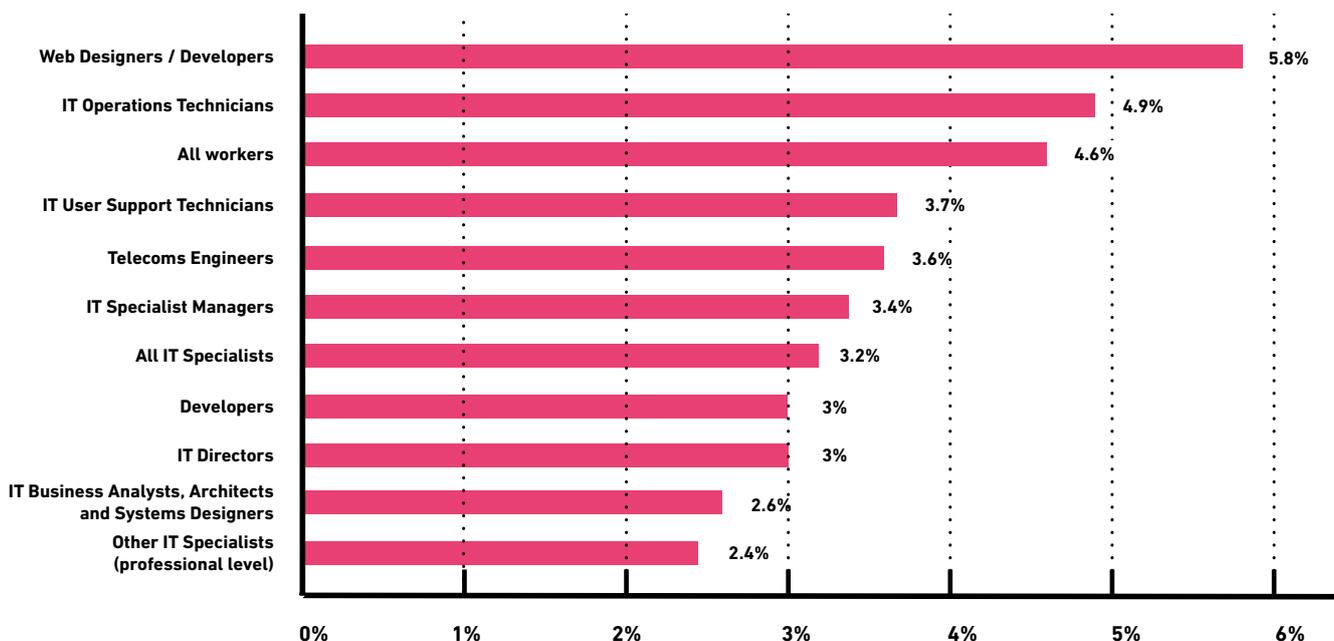
This report is about IT professionals. What is their experience of mental health issues? How does IT as a profession compare with other professions in the incidence of issues?

As with all areas of diversity, the picture for IT workers in mental health is mixed. In general, although there has been an upward trend in mental health issues for those in IT, it is lower than that for workers as a whole. But, the picture is less clear cut when the data is delved into. For example, IT contractors have more difficulties than the employed, as do female workers in the IT sector.

The incidence differs by specialism too: mental health conditions are most often apparent for web designers/developers — 5.8% of whom, on average, stated that over the 2014-18 period they had experienced 'depression, bad nerves or anxiety', or 'mental illness, or had suffered from phobias, panics or other nervous disorders' for a period of 12 months or more — a figure notably higher than that recorded for IT specialists in general and workers as a whole.

INCIDENCE OF MENTAL HEALTH BY IT OCCUPATION, 2014-18

Occupation	Incidence
Web Designers / Developers	5.8%
IT Operations Technicians	4.9%
All workers	4.6%
IT User Support Technicians	3.7%
Telecoms Engineers	3.6%
IT Specialist Managers	3.4%
All IT Specialists	3.2%
Developers	3%
IT Directors	3%
IT Business Analysts, Architects and Systems Designers	2.6%
Other IT Specialists (professional level)	2.4%

Source: BCS analysis of data from the ONS LAbour Force Survey

Perhaps counter-intuitively, bearing in mind the encouragement of work-life balance, part-time IT specialists are more than twice as likely to have mental health conditions as those working full-time hours (6.7% versus 3.0% during 2014-18) and this was reflected in the numbers for workers as a whole (6.9% versus 3.7%).

BCS wanted to ascertain IT professionals' experience of mental health issues in their day to day work, what they considered to be unique stresses, what they considered the effects on their careers to be and how organisations approach amelioration. In addition to quantifying questions, we also encouraged participants to complete a number of free text sections, where we could get a sense of concerns in a more informal way.

PERSONAL EXPERIENCE

In the BCS research, experiences of stress at work are fairly high, with 66% of people rating it seven out of 10 or higher (10 denoting the highest stress level). When this was drilled into, the two most significant causes were 'heavy workload' and 'tight deadlines' — and workload was the most likely choice to appear in the participants' top five. However, the good news was that 'conflict with co-workers' and 'boring work' both scored low on the stress assessment; indeed, 'boring work' was least likely to appear in participants' top five stress factors.

In the free text section, a number of other factors came up regularly, some of which are within the gift of an organisation to control: lack of flexible working policies, overly bureaucratic procedures, 'horrendous commutes', shifting objectives (also mentioned in this context — constant changing of priorities and decisions) and high co-worker turnover.

FOREMEN / SUPERVISORS BY OCCUPATION, 2014-18

	With mental health condition	Total
IT Specialists	35%	38%
All workers	24%	31%
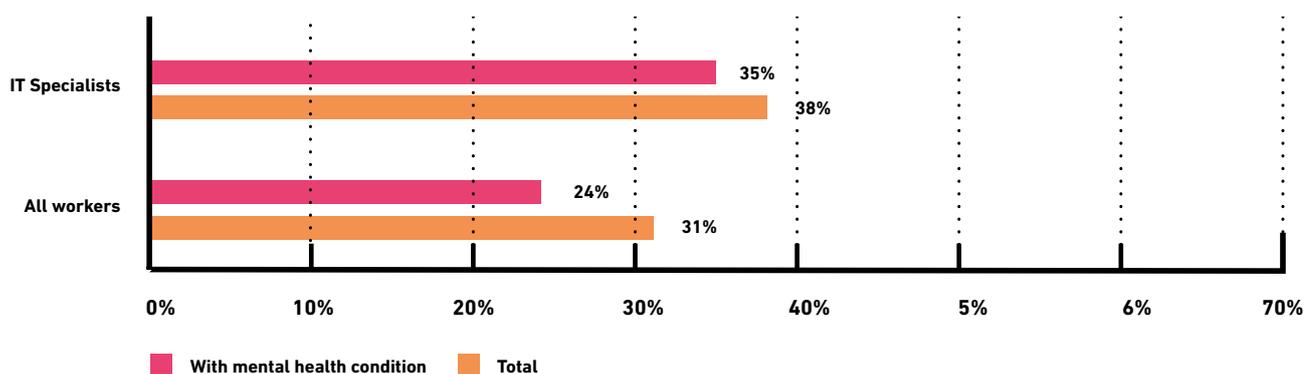
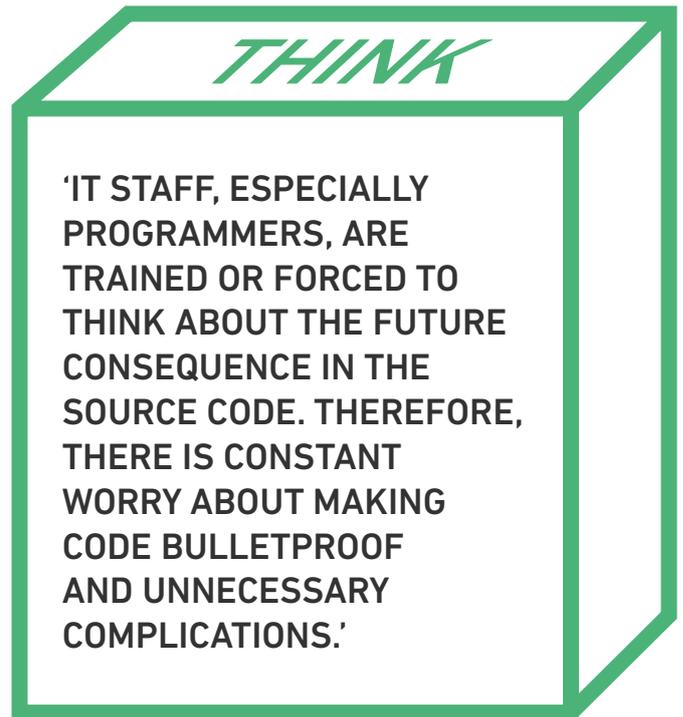Source: BCS analysis of data from the ONS LAbour Force Survey

In the past twelve months 43% considered their stress level to have increased and in that timeframe, 21% have been absent from work on the grounds of stress, anxiety or depression. In a five-year timeframe, that number stands at 38%.

46% reported that they had been absent from work on the grounds of stress, anxiety or depression and have, on at least one occasion, attributed the reason to their employers as another illness.

DISCLOSURE AND CAREER EFFECTS

How did those involved in this survey feel their career had been affected? Only 25% of those diagnosed with a mental health condition said they would reveal this prior to being offered a job. Of these, 59% felt that this would have a negative or very negative effect on their career. Clearly confidence in corporate understanding of mental health issues is low.

Of the 75% who would not disclose a mental health condition prior to being offered a job, 94% felt it would have held their career back to do so.

THINK

'IT STAFF, ESPECIALLY PROGRAMMERS, ARE TRAINED OR FORCED TO THINK ABOUT THE FUTURE CONSEQUENCE IN THE SOURCE CODE. THEREFORE, THERE IS CONSTANT WORRY ABOUT MAKING CODE BULLETPROOF AND UNNECESSARY COMPLICATIONS.'

When actually in-post, a large contingent felt their work was affected by their mental health.

Of those who have a diagnosed condition, 73% felt their ability to carry out their work had been either 'negatively' or 'very negatively' affected.

IN WHAT WAY DO YOU FEEL DISCLOSING YOUR MENTAL HEALTH CONDITION WOULD AFFECT YOUR CAREER?

6% 0% 6%

- Very negative effect
- Negative effect
- No effect
- Positive effect
- Very positive effect

53%

35%
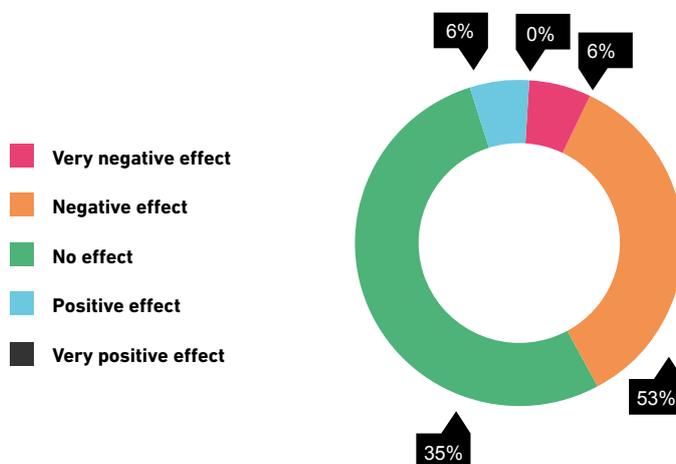
Source: BCS. Base: all who would disclose their mental health condition to their manager / organisation prior to being offered a job (n-17)

AMELIORATION

It seems that when in-post, the feelings of people toward revealing mental health issues improves somewhat. We asked whether participants had discussed their mental health with their managers in the last two years. On the positive side, 30% had done so — and a further 34% would be willing to do so — although they hadn't done so to date. The negative was the 36% who felt unable to do so.

It is unrealistic to expect all people who suffer with these kind of issues to be willing or able to discuss them in a corporate environment but, for those who were, we wanted to find out what kind of help had been extended and what they thought might reasonably be added to their coping toolkit. There seems to be a fairly good level of understanding towards time off for appointments or treatment and flexible working arrangements (although 41% didn't have the latter offered at all). Other coping mechanisms offered by organisations were very patchy indeed, as you can see in the full research paper on MyBCS.

The verbatims in this section raised other interesting ideas — and also told a story on why there is no one-size-fits-all solution for techniques or even company culture. For example, one commenter said that a one-to-one with HR 'sounds like a nightmare'. Another commented on generalist advice: 'there was a blanket offer of "what can we do to help?" although most of the above (our list) were not offered at all.'

Some respondents made practical suggestions to help: flexibility with deadlines, specific policies to help remediate stress and an employee support service, such as having assigned mental health first aiders. On the purely human level, commenters suggested 'general sympathy and consideration in one-to-one meetings', as well as things as simple as 'time to discuss these issues with peers, with consideration made to communication channels between colleagues'.

Specific help participants actually benefited from was lighter on the ground. One positive, 'the company paid for 20 sessions with a clinical psychologist' was mentioned. Some respondents were offered an occupational health appointment and counselling through employee healthcare schemes.

At the management level, 40% of respondents had line manager duties, but only just over a quarter of those had received any mental health training.

38%
HAVE BEEN ABSENT FROM WORK DUE TO STRESS, ANXIETY OR DEPRESSION IN THE PAST FIVE YEARS

UNIQUE PRESSURES OF IT

Only 23% of respondents felt that the IT industry did not have unique mental health pressures. 48% felt it did and the rest were not sure. We had substantial verbatim feedback on this. Whilst some of the things listed could equally apply to other professions, the comments nonetheless made for sobering reading.

PACE OF CHANGE

The pace of change is ever-present when discussing IT; whether that be the tech itself, changes in IT methodologies, or working practices.

As one commenter said, the 'conflict between meeting evolving needs of the business and maintaining existing infrastructure is more extreme in IT than other services, caused by the speed of change in the technologies and skills we need to know and provide.'

The technology itself mitigates against peace of mind, said one person, 'as we work within an industry where constant communication is always possible via Skype, Slack, emails and even on personal phones, I feel sometimes this can actually impede employees from switching off from work and can cause serious burnout depending on the company you work for. The perfect example is the company I currently work for. It is a global company and employees regularly voice their concerns about burnout, with a combination of aggressive targets and passive aggressive managers who constantly badger their employees for results. It's a fast pass to employees feeling overwhelmed, stressed and, in turn, affecting performance.'

36%
FELT UNABLE TO DISCUSS THEIR MENTAL HEALTH WITH THEIR MANAGER

Another comment implied the effects on professionalism: 'the pace of change in technologies and the breadth of technologies used means we rarely get to be an expert in anything and if we do, it doesn't last. This leads to an exhilarating but worrying need to run as fast as we can. We can't afford to stand still!'

FEEL

'I FIND SOCIAL MEDIA EXTREMELY STRESSFUL AND UPSETTING, YET HAVE TO ENGAGE IN IT IF I WANT TO FIND CONTACTS AND A ROLE.'

CONTRADICTORY PRESSURES

An interesting strand of comments was on the contradictory nature of some of the pressures. An example: 'The insular nature of the work, combined with delivering alongside others seems contradictory, but is really how most people have to work in the software industry.'

The tension between different cohorts is also a factor. Wrote one commenter: 'customer expectation vs organisational resources don't always match, especially when users come from university or dynamic businesses to more restrictive highly-regulated environments. This leads to stress and friction.'

Another issue is misunderstanding, according to another respondent: 'non-technical managers and clients can be over-demanding but won't listen to technical advice.'

Something that came up in the comments several times was impostor syndrome, with one participant saying this was 'common and often caused by a culture of bullying and expectations to remain current in an ever-changing industry.'

Another cites the 'clash between the need for creative thought (needs time and a clear head) and the need for delivery (tight, fixed deadlines).'

And, is there still an issue with those who are attracted by IT? One commenter said: 'a lot of those working in the IT industry do so because they have an interest in IT NOT people. Therefore, the majority of those in the IT industry have no people skills compared to other industries, but these people have to manage others and they do so poorly.'

BOARD-LEVEL UNDERSTANDING AND IT CULTURE

For as long as almost anyone can remember, the disconnect between IT specialists and the board has been discussed. And this theme came out loud and clear again in this research. Take these two comments:

- 'Directors not understanding that some issues cannot be resolved as quickly as they would like.'
- 'Translating very complicated system/ enterprise process in lay terms to managers who are not technically trained to understand these issues.'

But, beyond that, the issue of the general culture of IT also came up in various forms. This included working methods, as one commenter wrote: 'flavour of the month methodologies lead to frequently changing and often conflicting timelines and drivers. The flux in IT generally can be very challenging.'

Working hours also reared its head. One person lamented the 'desire/requirement for workers to work outside work hours to complete projects that were mis-sold to clients — on shorter deadlines than are actually feasible — in order to make sales. This is almost universal across the sector so is difficult to escape.'

94%
OF THOSE WITH A MENTAL HEALTH CONDITION BELIEVE DISCLOSING IT WOULD HAVE HELD THEM BACK IN THEIR CAREER

Again, on working methods: 'the increasing (mis)use of agile approaches with an emphasis on unrelenting cycles of delivery and constant increases in delivery expectation; the increasing use of social media as a means of finding jobs and contacts. I find social media extremely stressful and upsetting, yet have to engage in it if I want to find contacts and a role. The pressure to keep on adding to one's profile, the rudeness of the discourse. This is true for Twitter for example, and also for Slack channels — the constant stream of messages, most of them irrelevant, is overwhelming, noisy and unhelpful.'

Some areas of IT are almost set up for issues, as one cybersecurity expert said 'the challenge of maintaining security but my work only being visible when things go wrong adds to the stress.'

And culture extends to working practice of course. One person drew attention to these issues: 'working at a computer all day brings physical stresses which can exacerbate mental ones. When working alone for much of the time, you can feel more isolated and others are less likely to notice that there is a problem if you don't mention it yourself.'

The combination of these issues also mitigates against the handling of mental health issues. According to one line manager: 'use of contractors on short term contracts means that for managers it can be difficult to spot where mental health problems are arising. Also, the very nature of short-term contracts will lead to increased levels of stress. This can affect both temporary staff on short-term contracts and permanent staff who move frequently between projects within the same organisation.'

One final comment here, which implied something more positive about IT professionals taking things such as ethics more seriously... 'IT staff, especially programmers, are trained or forced to think about the future consequence in the source code. Therefore, there is constant worry about making code bulletproof and unnecessary complications. Relief from this or increase in time and deadline will help reduce worry.'

24/7 CULTURE

Of course, work culture reflects culture at large. One commenter made this perceptive point: 'the modern culture of needing everything instantly puts IT workers under the same sort of stress which retail workers have had for hundreds of years. Only now IT can involve more than one customer shouting at you. All customers are shouting because something is broken.'

Another wrote: 'many non-IT colleagues vent their frustration and anger towards IT staff, often blaming or directing blame, contributing to increased pressures. As IT is online 24/7, staff also have an expectation for IT staff to work 24/7/365.'

And this discussion comes full circle with this next comment, connecting culture and an indicator for mental health pressures. The writer sees the problem as '24/7 "on" culture; culture where excessive drinking is tolerated and often encouraged; and tech-bro culture.'

KEY FINDINGS, MENTAL HEALTH

- 56% of respondents indicated that their workplace has a mental health policy.
- About two-thirds of participants felt that their job is stressful.
- The top two factors cited as making a job stressful were heavy workload and tight deadlines.
- Nearly half of respondents (48%) felt there were unique pressures in the IT industry that affect the mental health of employees.
- 46% of respondents admitted that they have been absent from work because of stress, anxiety or depression, but did not disclose the real reason, attributing their absence to another illness.

DO?

'THE COMPANY PAID FOR 20 SESSIONS WITH A CLINICAL PSYCHOLOGIST.'
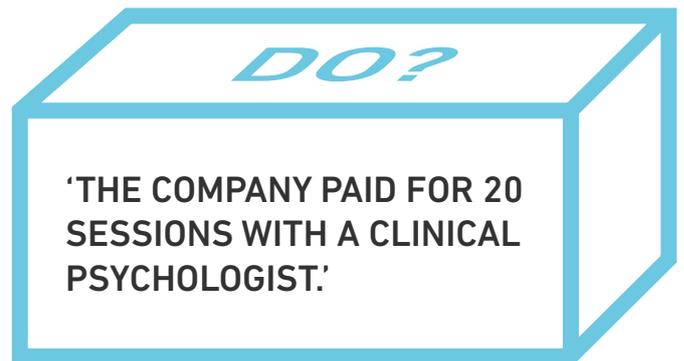
BCS ANALYSIS OF ONS DATA KEY FINDINGS

- The incidence of mental health issues amongst IT specialists is lower than that for workers as a whole, though there were approximately 58,000 IT specialists with a mental health condition working in the UK during 2018.

- The incidence of mental health issues amongst IT specialists has followed an upward trend over the past five years.

- IT specialists with mental health issues are typically less happy and less satisfied with life, feel life less worthwhile and feel more anxious than those without such conditions.

- IT specialists with mental health conditions typically earn around 13% less than IT specialists without them.

- Amongst IT specialists, mental health conditions are most often reported by web designers/developers and IT operations technicians.

- Mental health conditions are more common amongst IT contractors (the self-employed) than those working as employees and the difference is even greater between IT specialists in permanent as opposed to temporary work.

- Women working in IT positions are almost twice as likely to report having mental health conditions as their male counterparts and the incidence of mental health amongst part-time IT specialists is more than double that of full-time IT workers.

- The incidence of mental health conditions amongst IT specialists decreases with higher levels of educational attainment.

- Perhaps surprisingly, the incidence of mental health conditions appears lower amongst IT specialists working in London than in other UK nations/regions.

- IT specialists working in IT businesses are less likely to have mental health conditions than those working in other parts of the economy.

- IT specialists working in the public sector and 'other services' are most likely to report having mental health conditions.

13%
THE AMOUNT IT SPECIALISTS WITH MENTAL HEALTH CONDITIONS EARN LESS THAN THOSE WITHOUT THEM

AI AND YOUR JOB...

'MSN fires its human editors.' This was another in a long line of 'AI will take your job' scare stories. And, as night follows day, the AI made a high-profile error a few days later, confusing mixed-race singers from a popular band.

These particular processes are not journalists in a recognisable sense, but algorithms used to draw news from other sites. However, worries about job loss — and the subsequent bias in the image selection process — neatly encapsulates the issues facing people as they explore the world of work and tech companies as they try to deploy this tech.

The latest BCS research shows that the opportunity, at least for the present, is for businesses to train their people to work with AI — collaboratively — rather than AI being a source of job loss.

50%
ARE AIMING TO DEVELOP AI SYSTEMS TO HELP PEOPLE MAKE BETTER DECISIONS

The question of job threats often comes to the fore as a key question with the advent of almost any new technology — but AI casts a particularly long shadow because it seems set to threaten jobs beyond the mechanical and repetitive.

In that context, one of the key questions in BCS' AI research was 'are you (or will you be) developing AI systems that will remove the need for people to make decisions or help people to make better ones?'

Only 3% said they were looking at removing the need for people in the process — 50% cited their motivation being 'to help people to make better decisions' and 39% went for a combination of the two. These are very top line results of course, but perhaps indicate that the job panic is as yet early.

Those being more specific in their answers seemed to follow the idea that assisting decision making, or, as one answerer wrote 'helping people make sufficiently accurate assessments and decisions significantly more efficiently and with less effort' seemed to be the balance. This was also reflected in the 80% who felt that the more desirable approach to decision making was augmenting it for people, rather than removing people from that process.
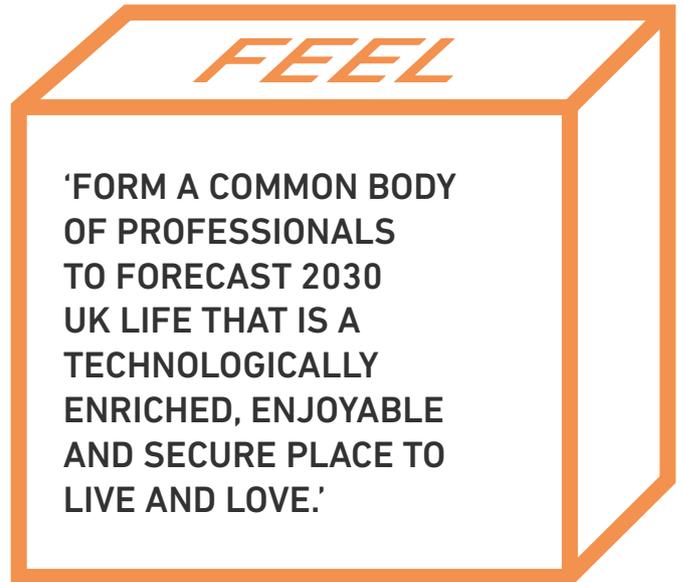
SHOULD I STAY OR SHOULD I GO?

We asked members what roles they expected to see replaced within five years. Some respondents were adamant that there would be none. With reasons varying from 'reliable systems need clear architectural decisions' to the (perhaps justifiable and very specific) contextual fears of 'working in nuclear engineering systems'.

However, most respondents expected a shift in working. Said one commenter: 'I expect people will think that testing can be automated by AI.' Another remarked that the replacement of roles would consist of 'almost everything, except where human emotions are involved — caring, sales, cooking.'
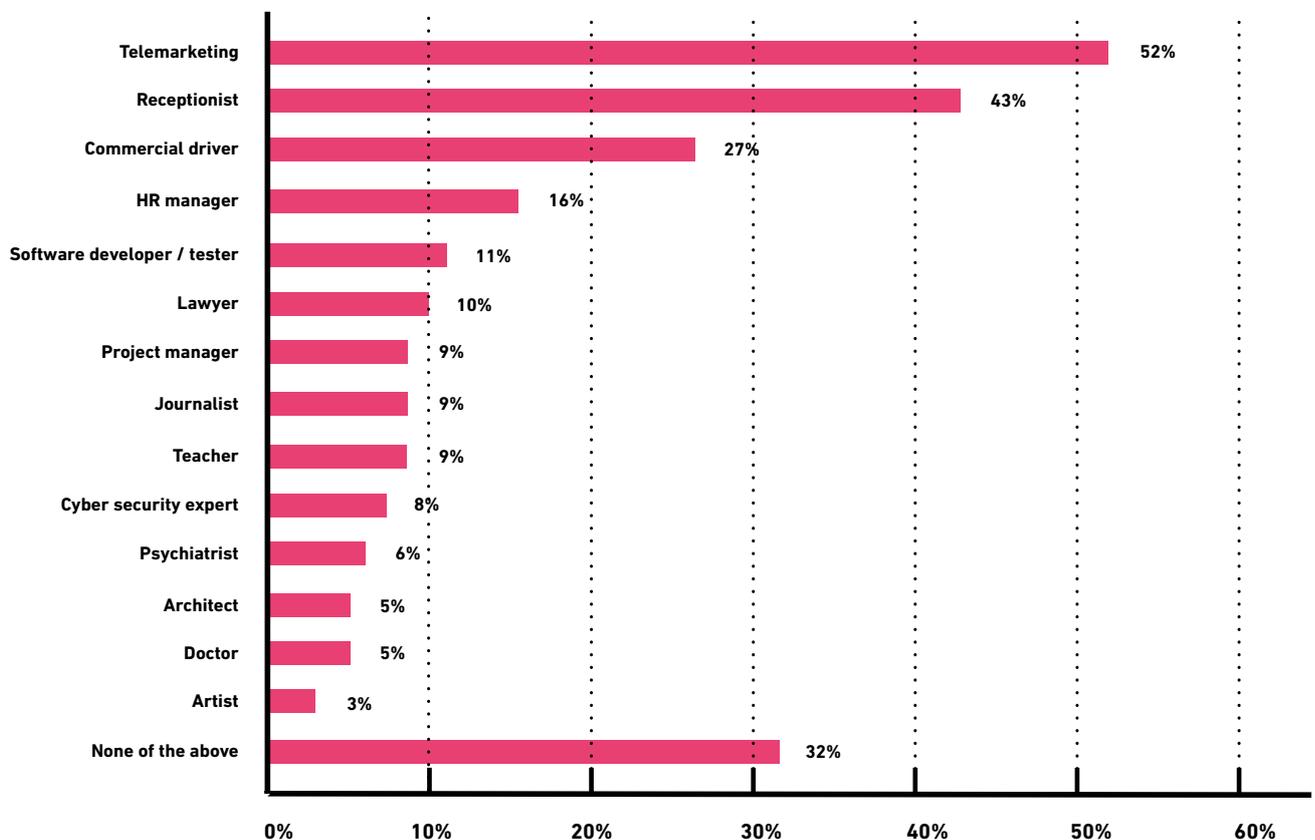
GO?

What roles are in danger? The following chart was produced from a limited set of notional options in answer to the question 'which of these professions, if any, do you think will become obsolete within the next 10 years as a result of AI?'

3%
ONLY LOOKING TO REMOVE PEOPLE FROM PROCESSES

FEEL

'FORM A COMMON BODY OF PROFESSIONALS TO FORECAST 2030 UK LIFE THAT IS A TECHNOLOGICALLY ENRICHED, ENJOYABLE AND SECURE PLACE TO LIVE AND LOVE.'

WHICH OF THESE PROFESSIONS, IF ANY, DO YOU THINK WILL BECOME OBSOLETE WITHIN THE NEXT 10 YEARS AS A RESULT OF AI?

Profession	%
Telemarketing	52%
Receptionist	43%
Commercial driver	27%
HR manager	16%
Software developer / tester	11%
Lawyer	10%
Project manager	9%
Journalist	9%
Teacher	9%
Cyber security expert	8%
Psychiatrist	6%
Architect	5%
Doctor	5%
Artist	3%
None of the above	32%

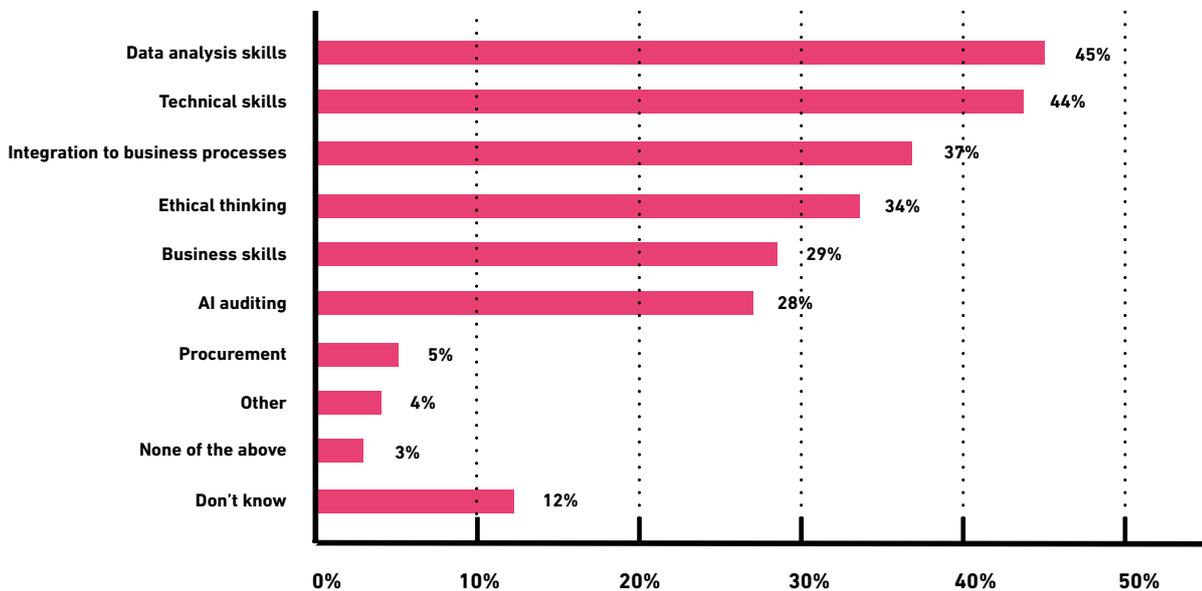Source: BCS

Other specifics mentioned included:

- Call centre staff (said one commenter: 'there is a massive opportunity to revolutionise the customer-facing activities in our organisation. From being the first point of contact to contextually sign-posting relevant materials, through to full automation of certain requests, we could both improve user experience and extend support hours without incurring massive additional costs').
- Middle management and its attendant roles — planning, survey analysis (irony?).
- Traditional administrative and clerical roles: claim handling, credit approval, underwriting, stock ordering, receptionists.

- Junior professional functions such as those in law, accountancy, finance, risk management, trading and book-keeping,
- Advice services (as one commenter summarised: 'anything rule-based'): legal, translation checking, finance and HR, data entry,
- Medical diagnostics, radiology.
- Crime reporting.

STAY?

When we asked what skills are most difficult to recruit for, we got, by implication, a ready-made list of potential careers. These are the top-level results:

WHEN ADOPTING AI TECHNOLOGIES, WHICH SKILLS DO YOU CONSIDER ARE MOST DIFFICULT TO RECRUIT FOR?

Skill	Percentage
Data analysis skills	45%
Technical skills	44%
Integration to business processes	37%
Ethical thinking	34%
Business skills	29%
AI auditing	28%
Procurement	5%
Other	4%
None of the above	3%
Don't know	12%

Source: BCS

THINK

'IN ORDER TO BUILD UP THE CONFIDENCE AND TRUST OF THE PUBLIC, AI SYSTEMS NEED TO BE RIGOROUSLY TESTED BY INDEPENDENT BODIES, IN REALISTIC SCENARIOS, TO GATHER INDEPENDENT EVIDENCE THAT THE TECHNOLOGY IS SAFE AND PREDICTABLE. IN ADDITION, A REGULATORY FRAMEWORK SHOULD BE PUT IN PLACE TO PROVIDE THE ROBUST AND FORMAL CODES OF PRACTICE TO ENSURE EFFECTIVE OVERSIGHT AND SAFEGUARDING.'

The free text also held some interesting nuggets that reflected the need for creative human thinking in the system: 'conceptual understanding of the art of the possible'; 'understanding the cognitive psychology of decision-making'; 'deep philosophical expertise'; 'identifying which parts of complex systems will benefit from AI automation'.

And, of course, some jobs will come out of AI directly, or see an increase in existing demand — AI application development, data cleansing experts, bias consultation, resilience analysis in the security context, legacy data expertise.

THERE'S MORE

This survey runs to nearly 50 pages, including the verbatim remarks we received. A number of other areas are covered which we haven't touched on here: the technologies organisations are using to create AI services; the difficulties faced when trying to create inter-disciplinary teams; methods used to develop internal AI talent; the external support needed; a ten year view on new roles; and ideas on what government should do to promote AI development in the UK.

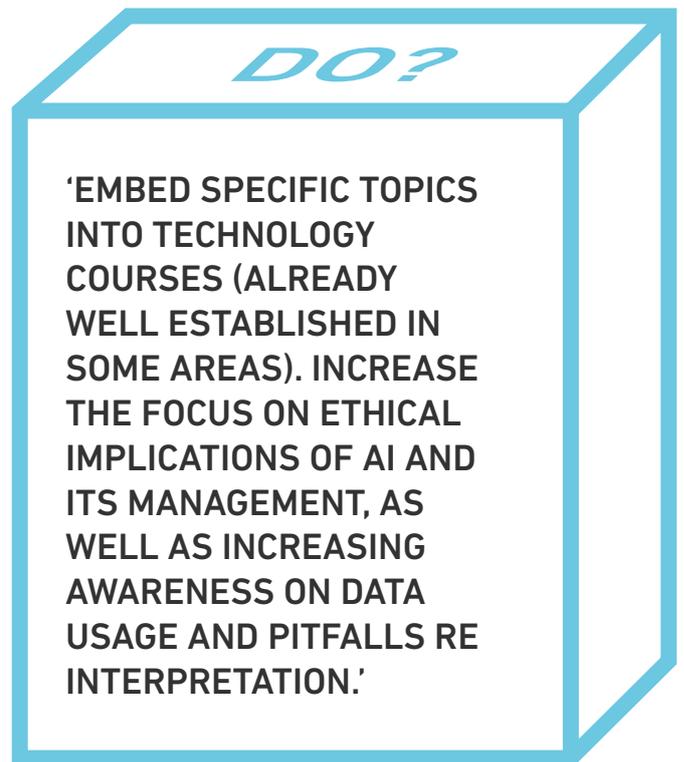A full report will be available on bcs.org in July.

AI USES

Current uses made for interesting reading — broadly split into emerging disciplines such as driving support, situational awareness, security; and AI applications with a longer history: computer vision, medical diagnostics, text analytics, scientific modelling.

The future requirements had similar answers, but with a lot more emphasis in specific areas — chief among them fraud detection and security applications. Also mentioned — user verification in different geographical territories and, in medicine, classification of patient results and automatic diagnosis.

KEY FINDINGS, AI

- 55% of participants claimed that their organisation currently uses AI or machine learning applications.

- Among those who don't currently use AI, 31% indicated that they have plans to do so. This represents 14% of all organisations represented.

- Among organisations currently using AI applications, the top two uses are 'assisted or augmented decision making' (55%) and 'predicting outcomes based on business data' (53%).

- When adopting AI technologies, the skills that respondents consider to be most difficult to recruit for are data analysis skills (45%), technical skills (44%), and integration to business processes (37%).

- 45% of respondents using AI indicated that their expectations of its usefulness have been met up to now. 20% felt it hasn't been met and 35% were neutral.

DO?

'EMBED SPECIFIC TOPICS INTO TECHNOLOGY COURSES (ALREADY WELL ESTABLISHED IN SOME AREAS). INCREASE THE FOCUS ON ETHICAL IMPLICATIONS OF AI AND ITS MANAGEMENT, AS WELL AS INCREASING AWARENESS ON DATA USAGE AND PITFALLS RE INTERPRETATION.'

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