

An aerial photograph of a city skyline, likely London, with a green overlay. The image shows various buildings, including a prominent one with a diamond-patterned facade. The sky is overcast with grey clouds. The text is overlaid in the center of the image.

# **DIGITAL REVOLUTION**

## **UK TECHNOLOGY RESEARCH 2019**

### **RESULTS PAPER**

# INTRODUCTION

UK businesses are facing a new digital revolution.

'Digital revolution' refers to the way technological innovations have transformed traditional production and business techniques. In the latter half of the 20th century into the beginning of the 21st, the rise of computers, mobile phones and the internet changed how businesses and the world at large operated.

***Technology is becoming so central to businesses that Gartner predicts that by 2021, IT will be the most influential department within companies.***

Now these technologies are integrated into the world of work, but a new wave of technological advances is beginning to once again alter how business is conducted. The shift to the cloud is almost complete; AI, IoT, RPA and Blockchain will build on this to enable innovative new solutions to problems and could change the nature of work. Technology is becoming so central to businesses that Gartner predicts that by 2021, IT will be the most influential department within companies. This report will aim to quantify the extent of these changes and assess whether they have a 'revolutionary' impact.

***Slow adoption of new technologies begs the question: are their touted benefits empty hype?***

The report will also measure the nature and severity of the challenges businesses face.

Asymmetric cyber-attacks mean businesses are always playing catch-up. Issues moving to the cloud are preventing them from modernising. Slow adoption of new technologies begs the question: are their touted benefits empty hype? Skills shortages are hamstringing progress in almost every area, and a shocking lack of diversity permeates the industry.

Legislation such as GDPR and the Brexit deadlock add additional layers of complexity to operations. This research explores these problems to measure attitudes towards them, their scale, their causes, and to analyse potential solutions.

# METHODOLOGY

This report will move through 5 sections: business challenges, cyber security, cloud, emerging technologies and skills.

The report will use both primary and secondary data. The primary data collection was carried out through surveys and interviews. The purpose of the survey was to get quantitative data to measure key metrics that can be compared and contrasted to previous year's results.

The interviews were conducted to get a perspective from people in key industry positions. The combination of quantitative and qualitative research methods results in a comprehensive and rounded approach to each question and section. Secondary data from online news sources, academic journals and elsewhere allows us to place the report in context and extend it beyond the scope of our limited resources.

# BUSINESS CHALLENGES

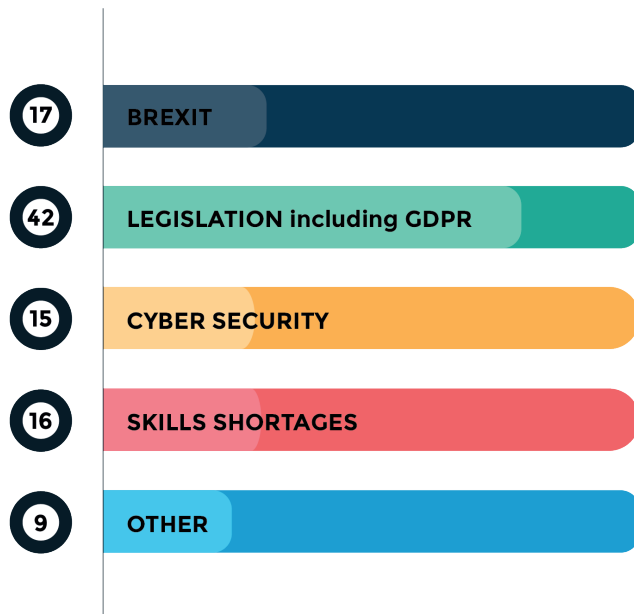
This section aims to understand the broader strategic problems businesses are facing. This gives a picture of the biggest problems they are contending with and will help to contextualise the rest of the report

## **Which external factor has had the greatest impact on your business since 2018?**

40% of businesses said that legislation (including GDPR) was the external factor with the biggest influence on them in the past year. This was the same as last year.

Multiple interviewees mentioned how GDPR was preventing them from using the data they collect and from sharing data within their organisation. This can stop them extracting meaningful insights and hinders progress with AI development.

Brexit, cybersecurity and skills shortages were the next three options. Brexit has moved up from last year. This could be because it is a more imminent risk, having been due to happen in March and now very likely to happen in October.



There were some interesting write-in responses to this question. One respondent simply wrote “entropy”, meaning lack of order or predictability. Another wrote that cuts to government education funding had the largest influence on their business. This echoes last year when people cited the impact austerity was having on their organisation.

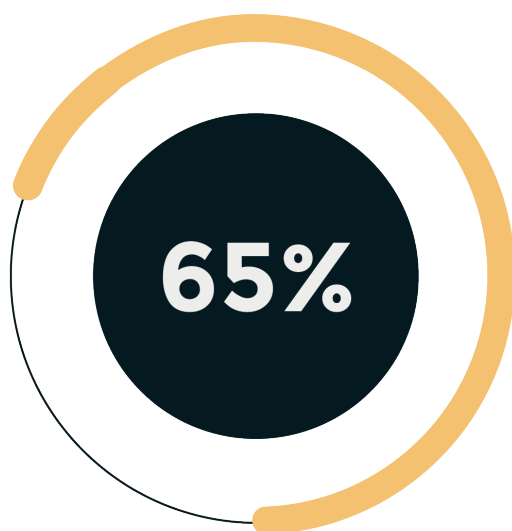
This demonstrates how cuts do not only affect public services and their users, but businesses in the private sector who must also deal with fewer resources and larger strains with many businesses are essentially an extension of public services due to privatisation/outsourcing and so government cuts reduce their budgets as well.

## Do you have a contingency plan to deal with a no-deal Brexit?

Only around 1/3 of businesses have a contingency plan for a no-deal Brexit. This is an improvement on last year, when 80% of respondents said that they had no Brexit contingency plans but is shocking when compared to the widely touted risks.

Most interviewees expressed concern about the risk and uncertainty posed by Brexit. Anthony Khan from the research commercialisation team at the University of Birmingham highlighted its impact on high-tech innovation. Research funding has dried up and this prevents investment in the “blue-sky” research which generates innovation. Investment from businesses has also dried up because speculative high-tech research is not a priority when purse strings are tight.

We received some responses downplaying the risks of Brexit. One interviewee said that they expected no impact from a No Deal scenario and that it would improve business. It is unclear from the data how many of those without a contingency plan held this view, and how many were not contingency planning despite believing in the potential risks.



**NO Contingency plan in place for NO Deal Brexit**

31

18

16

25

10

Predicted impact

## How important is digital transformation to your future business outcomes?

Most respondents said that digital transformation was “extremely” important to their future business outcomes.

Elise Olding, Research VP at Gartner told us that by 2021, CIOs will be as accountable for company culture as CHROs. This is because IT is where cultural change is happening and demonstrates how important it is becoming throughout businesses.

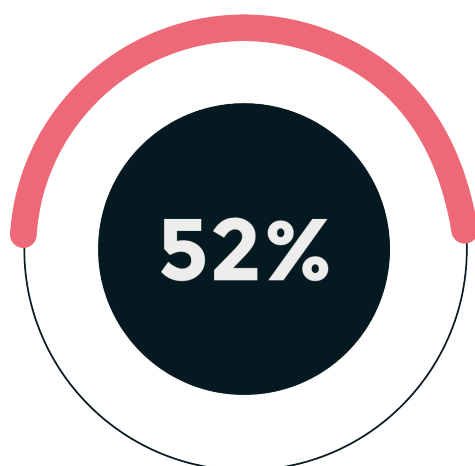
Julie Dodd, Director of Digital Transformation and Communications at Parkinsons UK, said that whilst progress has been made over the past few years, companies need to commit to more extreme measures. She noted that there was a tendency to hire one technical person at the executive level and to have a single IT department which deals with all things technological. Instead, businesses should have many specialists in different areas of “digital” at a high-level within the company and it should be integrated throughout the business in every department.

## How effectively do you feel your organisation is using its data?

52% of respondents believe that their organisation is using its data “moderately” well. This indicates that whilst efforts are being made, the potential benefits of quality data analysis are not being fully realised.

Julie Dodd, Director of Digital Transformation and Communication at Parkinson’s UK, said that data needs to become more central to the decision-making process because strategies need to be evidence-based. Companies can no longer rely on instinctive decision-making when they could develop data systems that will tell them empirically what they should be doing.

One of the biggest problems that businesses face in using their data is access. Peter Bishop, CIO of Birmingham City Council, said that there is a propensity to not share data, even between departments at the same organisation. He also added that GDPR was being used as a convenient excuse to not share data beyond the actual limitations it causes, hindering attempts to analyse and learn from it.

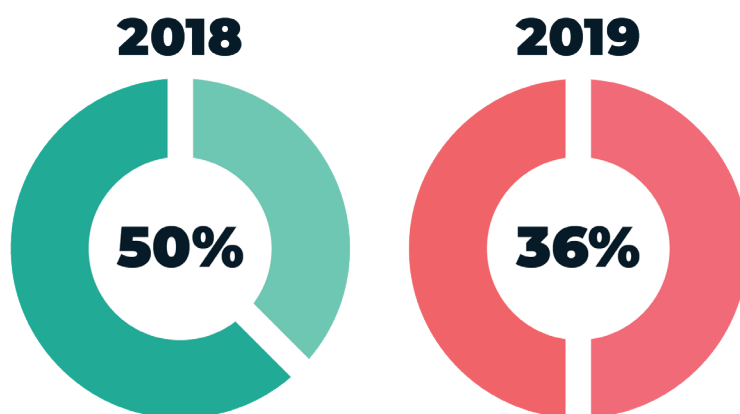


**Businesses using data ‘moderately’ well**

# CYBER SECURITY

## Has your business experienced an increase in cyber-security incidents in the last 12 months?

43% of respondents said that they had not experienced an increase in cyber-security incidents in the last 12 months whilst 36% said that they had. This represents no notable increase or decrease compared to last year.



**Businesses reporting an increase in cyber security incidents in the last 12 months**

We spoke to network and infrastructure manager at the Royal Shakespeare Company, Alex Loquens, about how he deals with the cyber threat. He stressed the need for pro-activity in preventing attacks. This involves regular penetration tests. He also said that if you fall victim to a ransomware attack like that which affected the NHS in 2017, do not pay them. This makes you a target as the attackers know you will give in to their demands and they can make money off you.

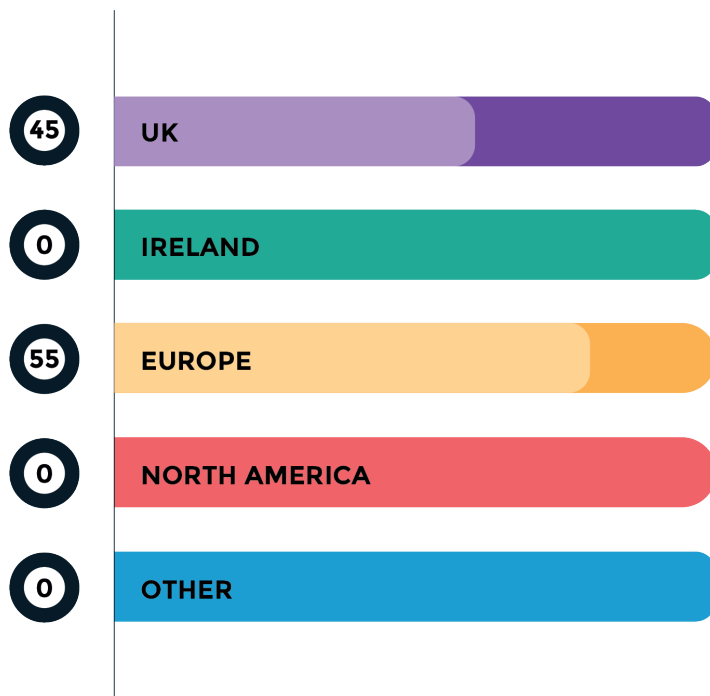
## Have you had to report more data breaches to the ICO in the past 12 months?

There was a fall in the number of companies having to report breaches to the ICO. 87% of respondents have not had to report more data breaches in the past 12 months compared to 69% last year. As the best practices of GDPR are followed this number should decrease again next year.

# CLOUD

## Where are your cloud services located?

45% of respondents' cloud services were located in the UK, and 55% were based elsewhere in Europe. This question was not widely answered.

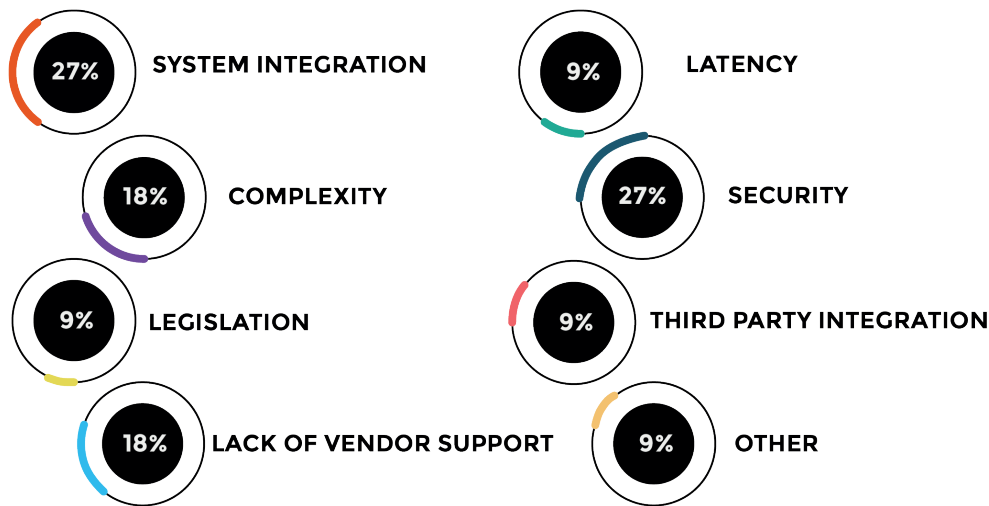


Cloud service hosting locations by %



## Are there any applications your business has been unable to move to the Cloud? Why?

29% of respondents said they had no problems moving applications to the cloud. Whilst this was the highest response, it is not a convincing majority. Security and systems integration were joint second with 14% each. Cloud services can improve security due to economies of scale. It is easier for AWS or Azure to secure their infrastructure, compared to in-house systems which are generally less comprehensively protected.



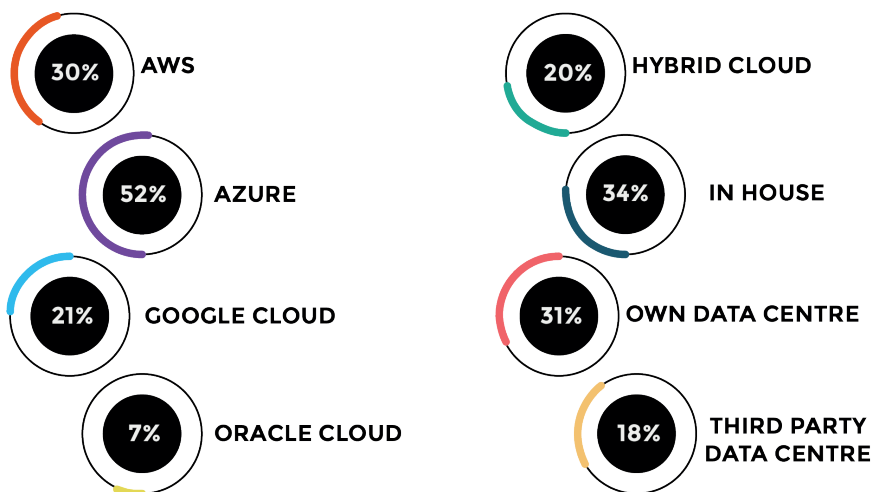
### Reasons for problems moving applications to the cloud

Elise Olding, research VP at Gartner, attributed the apprehension with moving to the cloud to IT's risk averse culture. Because the services they provide are so critical, for example, the network remaining up is vital to business operations, IT departments are quite conservative when it comes to changing things. This leads them to continue doing things the way they always have and stifles progress and innovation.

## Which cloud service providers are you currently using? (Select all that apply)

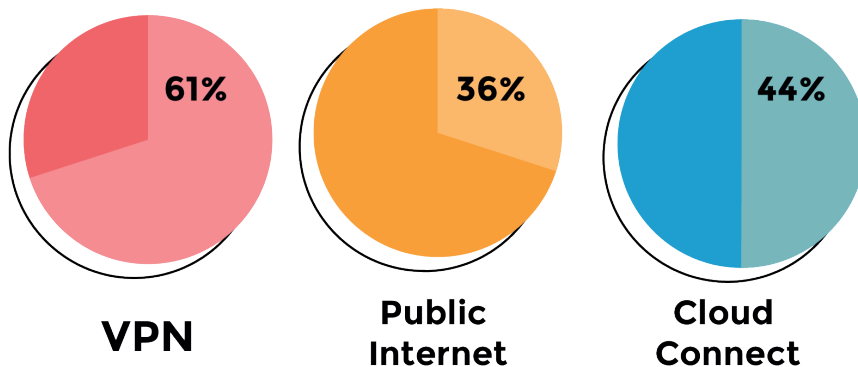
47% of businesses were using Azure, 31% were using AWS and 24% were using Google Cloud. These are generally considered the largest third-party cloud providers and so this comes as no surprise.

One common theme in the write in responses to this question was Dropbox. This reflects the prevalence of SaaS cloud products as well as more infrastructure-focused services like those outlined above.



## How are these interconnected?

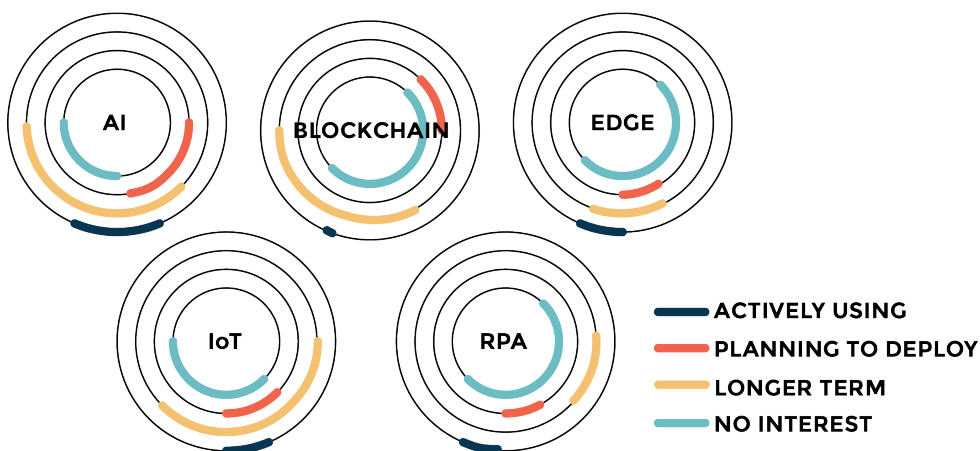
61% of businesses use VPN to connect their cloud services, 44% use cloud connect and 36% use public internet.



## EMERGING TECHNOLOGIES

Are you currently using or are you planning to adopt any of the following emerging technologies in the future?

The overwhelming takeaway from the answers to this question is that there is more interest than action in emerging technologies. The number of companies actively using these technologies is very small but for each technology at least 40% of businesses showed interest in adopting them.



Current use and adoption plans for new technology

IoT and AI were the emerging technologies people were using the most with 15% and 11% respectively. One problem with this question is that the scale of adoption is difficult to measure. For example, a company using IoT could mean that they have developed a sophisticated proprietary product, or it could mean that they have an Amazon Echo or Google Home in the office.

Only one company in the research group is actively using blockchain up from zero last year.

Anthony Khan from the research commercialisation team at the University of Birmingham told us that the route from high-tech research to market was known as the “valley of death”. This is because there are so many hurdles such as lack of investment and researchers being distracted with other projects.

The number of businesses who said last year that they would adopt certain technologies “within the next 12 months” is significantly higher than the number who have started using them.

Peter Bishop, CIO of Birmingham City Council, raised the question of ethics in the use of emerging technologies as a reason why adoption is low. He used the example of a predictive analytics programme that could predict when a family was going into crisis and need council support. Whilst it would be useful and could enable the council to better serve its constituents, it would also mean going to families and telling them ‘we think you are heading into crisis’ which could cause offence.

No interest was the highest option for every technology apart from AI.

## **What was the business objective of using these emerging technologies?**

38% of respondents said that reduced cost was the reason for using emerging technologies, 30% said expansion and 14% said compliance. This order is similar to last year when 53% cited reduced cost, 41% cited expansion and 15% cited compliance, but both reduced cost and expansion were around 10% lower.

A few interviewees described specific use-cases they had developed. Julie Dodd, Director of Digital Transformation and Communications at Parkinsons UK, detailed an AI chatbot they were developing to help Parkinsons sufferers. Parkinsons can manifest in many ways that each require different treatment and coping methods. Alongside 3 other charities and a tech company, Parkinsons UK developed an AI chatbot that can give sufferers tailored advice for their specific circumstances.

Another example was from Birmingham City Council who were trialling the use of IoT wristbands to monitor elderly people in the community. Remotely monitoring key health metrics means that health and social care workers don't need to visit them as frequently, saving resources, and also meaning they can remain independent in the community for longer.

## **Does your organisation have the skillset in-house to capitalise on these technologies?**

41% said yes, 23% said no and 36% were unsure. This is surprising given the answers to question 14. The areas where the skills shortage is most severe are essential to using many of these technologies.

Last year responses were much more equal with 31% saying yes and 29% saying no. This indicates that businesses have been actively recruiting and training over the past 12 months to be able to capitalise on emerging technologies.

# SKILLS

## In which areas have you noticed a skills shortage?

Software development has the biggest shortage is with 33% of responses. Dania Lyons, consultant at tech recruitment firm Mortimer Spinks, highlighted that software is now a talent-driven market. Because the shortage is so severe, developers can charge high rates, demand great benefits and are free to move around at will.

Traditional IT and cloud were the least popular options with only 9% and 2% highlighting them as problem areas respectively.

Several respondents highlighted Brexit as a key factor in worsening the skills shortage. Highly internationally mobile tech workers are leaving the UK before we leave the EU, and the pipeline of skilled immigrants from the EU has dried up amid the risk and uncertainty about their rights when they arrive.

Several respondents wrote in “all”, “all of the above” or “all of them”. This sums up the scale of the tech skills shortage.

## Are you actively addressing any skills shortage within your business?

45% of businesses are actively addressing a skills shortage within their business. Given how many said they were suffering from a skills shortage this is low.

The two most common way to address the skills shortage were ‘recruitment’ and ‘training’. Recruitment is a good way of bringing talent in-house, but it does nothing to solve the sector-wide shortage. It moves workers around in an industry where they are in short supply, rather than working to increase the overall supply.

Training is a better way to contribute to solving the skills shortage. One way that businesses said they were doing this was through graduate and school-leaver training schemes where they 'upskill' promising students. Another was identifying talented individuals within their business and retraining them in areas of need. Both methods end up producing more IT workers than there were before, something that is sorely needed.

## **Do you believe there is an issue with diversity in your organisation?**

Only 11% of respondents agreed that diversity was an issue in their organisation. When you compare this to other statistics that highlight the lack of diversity in tech, it raises interesting questions.

There are two possible explanations for this. Either 90% of the companies we surveyed are exceptionally diverse, or they do not see it as an issue. Other data shows that technology is very white, male and middle class.

## **If yes, what are you doing to address it?**

From the companies that did recognise the need to support diversity came a number of ways that companies could address this. One identified how "several different work streams to increase diversity" had been set up. Another that "top level management have made diversity a strategic goal as a part of the organisation objectives".

There were a few anti-responses such as multiple "nothing"s and a "best person gets the job". This reflects the previous questions general attitude that diversity was not a problem within their organisation.

Dania Lyons, recruitment consultant at Mortimer Spinks, noted how companies can tackle the skills shortage they face alongside diversity by providing training to those from underrepresented backgrounds and groups.

People from black and minority ethnic, LGBTQ+ and working-class backgrounds are all underrepresented in tech and the most pronounced disparity is gender, only 17% of tech workers are women. By providing opportunities specifically targeted towards these groups, firms can solve their skills shortages whilst diversifying their workforce.

She praised initiatives like the School of Code in Birmingham, a free coding bootcamp with a diverse intake. She also noted that the lower-levels of the industry are much less homogenous. It might simply be a matter of waiting for that to filter up to senior roles over the next 10-20 years.



# CONCLUSION


One year on, GDPR remains the largest external factor influencing tech businesses.

Emerging technologies are still generally seen as something for the future. A minority of businesses are actively using technologies like AI and IoT but the majority are still looking forwards in this area. A slight majority of businesses believe that they have the skill-set in-house to capitalise on these technologies. This bodes well for the future.

Brexit loomed large throughout the study. It was highlighted specifically as an external threat and as contributing to other issues like the skills shortage. Most interviewees were pessimistic about Brexit, particularly without a deal, and noted how the risk and uncertainty was preventing them from planning for the future.

Cloud services have embedded themselves within modern business. Yet, some issues remain. 29% of businesses faced issues moving services to the cloud so it is not a panacea, and there was a slight trend towards moving cloud services back in-house.

The digital skills shortage is at the front of people's minds and solutions are beginning to emerge. Companies are offering more and more training programmes to plug the gap and in doing so are producing more skilled workers and alleviating the shortage. This also presents an opportunity to improve diversity. Whilst a surprising number of survey respondents did not recognise a problem with diversity most interviewees did. They highlighted how initiatives to solve the skills shortage can be aimed at disadvantaged groups, killing two birds with one stone.

An aerial photograph of a city, likely Birmingham, with a semi-transparent green overlay. The image shows various buildings, streets, and green spaces. The text is overlaid on this image.

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