PUBLIC SECTOR TECHNOLOGY

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RETENTION

Feel the churn: preserving loyalty amid the 'big quit'

The so-called great resignation is starting to sweep the public sector. What can local authorities and other hard-pressed public bodies do to hold on to valued workers?

Peter Archer

In what's become known as the great resignation, more and more people are leaving their jobs in search of a better lifestyle, with many having relished their lockdown-enforced experience of remote working and the extra time it's given them with their families.

The trend is extending from the business world into the public sector. The Trades Union Congress has warned that a "toxic mix" of low pay, high workloads and a broader lack of recognition is pushing hard-pressed public servants to the brink. Its latest surveys indicate that 21% of key workers in the sector are "actively considering" a move into another profession.

This research is backed up by a survey from HR consultancy Randstad, which has found that 64% of employees in the public sector are feeling "confident to move to a new job in the next couple of months", compared with 70% in the private sector.

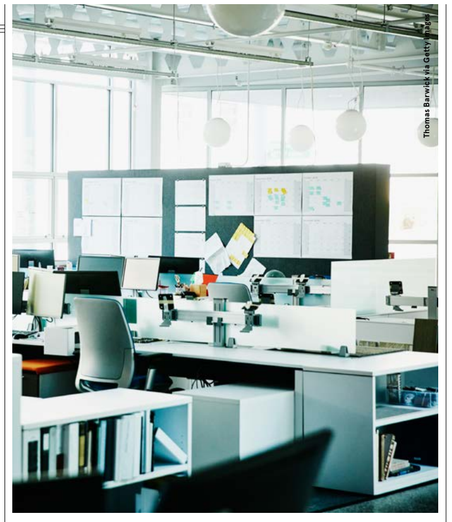
Randstad's senior director of operations in the UK, Adrian Smith, notes that comparatively few public sector workers changed jobs during the first 12 months of the Covid crisis. "That is leading to a deluge of resignations now. A number are suffering from burnout," he says, noting that the pandemic has prompted many people to rethink life, work and what they want from both.

"Workers in both the public and private sectors want to change one of the key aspects of their life – their job – and the high number of vacancies means that they can," Smith adds.

Job vacancies in the UK hit an all-time high in July, with the number of open posts exceeding 1 million for the first time, according to the Office for National Statistics. As more sectors of the economy reopen, demand for talent is fast outstripping supply. It's now most definitely an employees' market.

What can public sector employers do to prevent valued staff from walking away? One effective measure could be to upgrade their technology, "especially if that enables people to improve their work/life balance through hybrid working", says Dr Grace Lordan, associate professor in behavioural science at the London School of Economics.

"The pandemic has given many people a first taste of working at home and spending more time with their families for a better lifestyle," she says. "So now they're looking for jobs that can continue to give them such flexibility. The public sector will have to keep up in this respect. Otherwise, it will lose a lot of staff to the private sector."



Thomas Barwick/Getty Images

Peter Fleming is the leader of Sevenoaks District Council in Kent and chair of the Local Government Association's improvement and innovation board. He believes that local authorities nationwide have stood up well against the problems posed by the Covid crisis. Like other employers, they adapted their working methods quickly during the lockdowns, offering more flexibility to workers who were capable of doing their jobs remotely.

"Councils have worked hard to ensure that their services continue to be as accessible as possible, moving more of these to digital platforms where appropriate. Their ongoing modernisation has helped us to engage more effectively with our communities and also given us opportunities to automate routine tasks, thereby enriching jobs and increasing the skills of our staff," Fleming argues.

Using a range of systems and devices in a secure cloud, councils can help their front-line staff, who may work in various remote locations and on different shift patterns, to collaborate in a more effective and fulfilling way, he adds. IT upgrades may have been forced on local authorities by the pandemic, but the resulting benefits for staff could help to reduce the number of potential resignations.

In his October budget, the chancellor pledged £65m in funding for English local authorities to create a "new digital system" to "improve the planning regime". This should not only provide a better service for those seeking planning permission; it should also make life easier for council staff dealing with applications. The potential automation of some of the more humdrum administrative tasks could free them up to do more rewarding work.

Given the wide array of technologies on the market, finding the system that best suits the organisation's needs can be difficult. The key question to consider first is how much time is spent processing paperwork. If the answer is 'a lot', then tools that can automate workflows by sending documents electronically to the right people are likely to be a good option.

If the volume of work is likely to grow significantly, it will also be necessary to have a system that can easily be scaled up to keep pace with increasing workloads.

Most councils rely on enterprise resource planning (ERP) software, a suite of integrated applications for standard operational functions such as accounting and HR management. At their core is a database management system that centralises information from all departments. Integrating key processes, the technology streamlines workflows, empowers employees to collaborate and enables managers to access and analyse business-critical data as it's being generated.

But, as the pace of change increases, traditional in-house, server-based ERP packages can't always keep up. Forward-looking council leaders are therefore turning to the cloud.

Cloud computing, which has become ever more important since the pandemic started, has already transformed many businesses. Local authorities are now following suit – and their employees are benefiting as a result.

The cloud gives users remote access to the information they need via their smartphones and other devices. Staff who have busy schedules and/or work a long way from the office can easily keep abreast of what is happening elsewhere in the organisation.

key public sector workers are actively considering quitting

TUC, 2021

64%

of public sector workers felt "confident to move to a new job in the next couple of months", compared with

70%

of private sector workers

Randstad, 2021

Robert Daly/via Gettyimages

> **The increasing difficulty in recruiting externally highlights the need for employers to improve how they develop and retain their existing workers to counter labour shortages**

Such technology can engender a sense of belonging and shared purpose. Team members can, easily and securely, view and share information. Some cloud-based services even provide collaborative social spaces where employees across the organisation can connect, thereby increasing interest and engagement. This level of collaboration may be possible without a cloud computing solution, but it's very unlikely to be as easy to achieve.

Adopting the latest in digital IT alone is not enough when it comes to retaining talent. The introduction of any new technology will require councils to train staff in its use, but they also need to create a nurturing culture that encourages people to learn and develop themselves.

"The public sector is, unfortunately, rife with tight budgets," notes Darren Hockley, managing director at e-learning specialist DeltaNet International. "This means that there are limited resources and a limited number of people to do the work. The last thing that local authorities want to worry about is losing good talent."

Traditional training methods can be tedious, unengaging and ineffective, he adds, but artificial intelligence (AI) technology has the potential to totally transform workplace learning.

"Instead of repeating the same old training each year, using AI can offer more tailored, personalised experiences that will keep employees more engaged," argues Hockley. "Enabling employees to carry out this training online allows them to do any mandatory courses whenever and wherever they wish, working around their daily tasks and even from home if they are operating to a hybrid work model."

High-quality training, such as adaptive learning, doesn't force employees to go back over material that they already know. Instead, it recognises the value of their time, leaving them feeling more engaged with both the content and with their organisation, Hockley adds.

What's more, choosing to adopt user-friendly collaboration platforms such as Microsoft Teams or Slack will "allow immediate communication between teams and significantly improve workflow processes".

Ben Willmott is head of public policy at the Chartered Institute of Personnel and Development, a professional body for HR practitioners. He believes that the competition among employers to hire skilled people in a wide range of roles will only continue to intensify.

"The increasing difficulty in recruiting externally highlights the need for employers to improve how they develop and retain their existing workers to counter labour shortages," Willmott says.

"They need to focus on factors beyond offering a competitive salary in order to improve retention. These could include providing high-quality line management, different types of flexible working arrangements and opportunities for people to develop new skills and advance in their careers."

An enlightened approach to management should help to stem the flood of talent that's leaving the public sector.

Leaders of local authorities and other public bodies need to design a new employee experience that is fit for the Covid-19 era. They should listen more closely to staff feedback to improve the working environment, including any IT tools provided, and they should turn the insights they gather into action. Failing to act on a pledge risks incurring employee dissatisfaction and thereby defeating the object of any good consultation exercise.

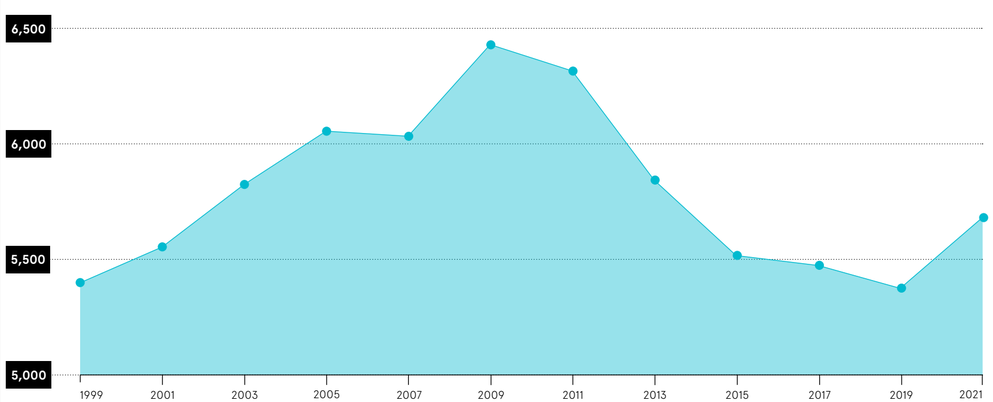
Retention is the newest battle for public sector employers and it is one which is being fought digitally. Workers are demanding high-quality IT tools so that they can produce their best work in a low-stress working environment.

Financial rewards are also important, of course, but only to a point. The consensus among HR professionals is that people want to feel part of something bigger: an organisation with a culture of emotional connection, recognition and communication. If public sector leaders aren't deliberately working to create such an environment, they're destined to fail.

Those enterprises which strive to be purpose-led will have a significant retention advantage over those which do not. If people are bought into the collective purpose of the organisation, they are much more likely to be happy in their work and far more likely to remain loyal to their employer.

IS THE PUBLIC SECTOR WORKFORCE SET TO START SHRINKING AGAIN?

Number of people employed in the UK public sector since 1999 (thousands)



Office for National Statistics, 2021

Going above and beyond: how can the private sector meet more than just a contract?

Meeting the brief is the bare minimum the public sector can do for citizens. At Capita, long-term problems are solved by applying the full might of technology and expertise

In Britain, you can never predict the weather, but that is exactly your job if you are responsible for gritting icy roads to make them safe in freezing temperatures. But each time Norfolk County Council gritted the most treacherous parts of its 6,200 miles of networks and bus routes, it would cost over £25,000 of public money and sometimes, temperatures wouldn't plummet, leaving unused grit on the asphalt. However, not gritting the roads could result in serious injury or even death.

The council needed a fix for this problem; a system which let the road itself say when it needed gritting. Capita provided the council with IoT sensors, that were then installed in key parts of each road that would inform the council of roadside temperatures.

"I haven't seen a partnership working this effectively ever," says Kurt Frary, assistant director of ICT & chief technical officer at Norfolk County Council. "We spend £3.4m on gritting runs every year to keep the roads safe. These are low-cost IoT sensors, but they help us grit when we need to grit and not grit when we don't need to grit, which saves £8,000 per grit run."

The public sector can achieve so much more than overcoming the British weather, says Andy Start, CEO of Capita Public Service. "We need to recalibrate public expectations of suppliers providing their services, not just meeting a brief, but solving the need for it in the first place," says Start. "Capita is helping the public sector move from older models of simple contract delivery and provide holistic solutions to real world problems. Post-pandemic, the models of the past are often not fit for the future. These models need to help accelerate levelling up, overcoming Covid and achieving net zero."

In many cases, the public need is served by infrastructure that wasn't enabled for large-scale home working. Capita partnered with the think tank Demos to study what citizens wanted from their post-pandemic public sector. 'The Social State' report found an overwhelming majority wanted to get to know the people who provide their local services (71%) as well as knowing other services users better too (64%).

Opening up and leveraging data and technology can help organisations see broad solutions, says Start: "The public sector can see immediately when someone misses a council tax payment. But what else can that tell us? We know, with human behaviour, that if you cannot afford to pay your bills, the first one missed is council tax. We can see this person may be struggling with other bills or issues too, allowing us to get ahead of the curve and help people and companies at the same time."

Helping customers in a flood of calls

When improving a public service call centre, the focus can often fall entirely on hiring more staff, installing more phone lines or increased online automation. At the Financial Services Compensation Scheme (FSCS), Capita was employed to ensure the smooth running of an organisation tasked with solving a dizzying array of calls.

Capita's response was a programme called Accelerate, a product which uses natural language processing to analyse the dialogue of customers' emails, calls and texts as well as in printed documentation to solve issues more quickly. By accelerating the process and improving accuracy, Capita's solution shortens waiting periods meaning decisions can be made more quickly.

This analysis of language also empowered the fight against crime. Previously, some call details could be lost in the rush to deliver service to customers. But now, with the help of AI, correspondence could be analysed to help piece together instances of fraud by large companies. This enabled the FSCS to spot instances of 'phoenixing' – when individuals from financial services firms go out of business, but later reappear in connection with other claims – and therefore help secure convictions and prevent future frauds from occurring.

> **We need to recalibrate public expectations of service, not just meeting a brief, but solving the need for the brief in the first place**

71%

want to know who their local services are provided by

64%

want to be connected to people in their local areas

Demos and Capita, 2021

"By harnessing a unique combination of software, digital transformation skills and talented people we can help government deliver better people-centric services," says Start.

Opening up better outcomes

The key to successful social services is to remove the gaps through which vital information can be missed. The Scottish Wide Area Network (Swan) is one of the most significant single public sector ICT initiatives undertaken in Scotland, creating a single shared network and common ICT infrastructure across Scotland's entire public sector.

By linking 6,000 sites across Scotland, including over half of all local authorities, 100% of hospitals, GP surgeries, pharmacists, and 90% of schools, Swan provides seamless but responsible data-sharing across multiple services. Since its launch in 2014, Swan is bringing reduced costs, improved service and the ability to share data across organisations, fostering co-operative working.

"Swan has the unrivalled ability to deliver a vital element of Scotland's critical national infrastructure for secure, everyday data sharing as well as the use of wider technologies such as 5G and IoT enabling the delivery of citizen and patient services that save time and money across the country" says Start. "The growing deployment of IoT sensors can also provide better and more accurate data on factors including water levels, air quality, footfall analysis and additional analytics for future health and social care services."

The service continues to have a positive impact on those who provide our public services; when last asked, 98% of user responses said Swan was "beneficial to their organisation."

Helping the public sector maximise the value of the public purse

If Covid-19 has shown us anything, it's the importance of being able to stand up new grant schemes quickly and to ramp up the delivery of existing schemes to disburse funds. In the early stages of the pandemic alone, Capita administered £750m of business grants for over 13 public sector clients as a direct result of Covid. It is now drawing on this experience to deliver digital grant management – through its software platform, Grantis – to digitise and fully automate the grant administration process.

It is far more intuitive for applicants who can check their eligibility and see exactly where their application is in the process. Not only will this support more successful eligible applications – getting entitlements to people quicker – it reduced instances of fraud, ultimately maximising the value of the public purse.

Contracts around the world are frequently measured on outputs and – while this serves its function – it means that long-term solutions are not considered, says Start. "When we think in terms of outcomes, rather than reactively managing symptoms, it is better for all parties. By shifting our perspective to seeing outputs as stepping-stones on our journey to delivering better outcomes, we are able to work more holistically, allowing ourselves to take a step back and view the results of our efforts as a whole."

By continually embracing new ways to unlock data, technologies and ways of working, the public sector can uncover new ways to tackle historically difficult challenges.

For more information please visit capita.com

Capita

PROCUREMENT

NHS grapples with the cyber threats to its supply chain

The healthcare procurement process is huge and complex, making it particularly vulnerable to cyber attacks. How can the service protect its supply chain?

Davey Winder

The NHS faces an increasing cybersecurity threat, with its extensive supply chain a particular vulnerability. What is the nature of the problem – and how can it be addressed?

The NHS's procurement process is as complex as it is sizeable, so cybercriminals will take the easiest attack option. That weak link is often to be found in the supply chain.

Elizabeth Giugno is head of category for cybersecurity at the Crown Commercial Service (CCS). In a recent article for *Digital Health*, she noted that the NHS had seen a "significant increase in cyber attacks since the beginning of the pandemic" and flagged procurement as a key focus for cyber resilience.

So how exactly do cyber attacks threaten the procurement process? A National Cyber Security Centre (NCSC) report in November 2021 has revealed that ransomware attacks are, unsurprisingly, high on the healthcare agenda. It highlights the danger of social engineering – where victims are tricked into opening the doors to an attack – and the threat posed when systems aren't up to date with security protections.

"The NHS struggles to get devices delivered with current and supported operating systems and especially keeping these maintained and patched once they are in," says Phil Howe, CTO at Core to Cloud, which provides cybersecurity technology and services to the NHS.

"Ransomware is clearly the major issue facing healthcare today." So says Dr Saif Abed, founding partner of cybersecurity advisory services at the AbedGraham Group, a clinically led regulatory affairs and risk management consultancy specialising in healthcare. When products and services are under consideration, procurement processes must be robust enough to judge their resilience "in the face of increasingly sophisticated attackers".

Dr Jacqui Taylor is CEO at cloud service architect FlyingBinary and an adviser to the UN on the effective use of new procurement practices. She underlines the complexity of the health service and the impact this has on the supply chain.

"We always discuss the NHS as if it were an organisation. It is not," Taylor says. "It is a complex series of organisations, most of which have autonomy over the way in which they procure services and, often, the services they supply."

Take GPs, the front-line physicians who are often the first contact for patients. There were 35,146 GPs across the UK in 2020, whose surgeries function as small businesses. Across such a fragmented estate, interoperability is a key weakness of NHS procurement.

> **The NHS is a distributed organisation... The cyber risks are unquantified and not understood**

"From a cybersecurity perspective the NHS is a distributed organisation connected by technology," Taylor says – one where "the cyber risks are unquantified and not understood, certainly by most of the people who work there."

Unsurprisingly, there are plenty of measures already in place to help secure the NHS supply chain from attacks. These include the mandatory DCB0129 Clinical Risk for Health IT standard, under which suppliers must show that they've benchmarked and assessed the patient safety impacts should their solutions be compromised.

There's also the Data Security Protection Toolkit, which demands baseline technical security standards and sets 10 security standards covering people, process and technology to help guide trusts. "Both of these can help to de-risk procurement," Abed says.

Then there's the Edge4Health platform, which aims to streamline the processes between suppliers and providers while increasing levels of compliance. This should provide a more agile way for procurement teams to engage with suppliers, while increasing transparency.

The problem from a pure cybersecurity perspective is that it's hard to judge how successful it can actually be. The reason, according to Abed, is that integrating standards and auditing their applications after procurement are "distinctly different challenges".

Taylor believes that the platform is yet another example of simply reinventing the wheel – something that the NHS "is famous for".

Indeed, the one-stop-shop idea is "almost, but not quite, as comprehensive as the set of cyber services that NHS Digital recommends via the NCSC framework", she says.

And then there's accreditation. Is it realistic to expect requirements such as Cyber Essentials/Plus or ISO27001 to reach all the way along complex supply chains?

These are about reviewing the controls in a statement of applicability, Howe says. They "show that a supplier has put in place, documented and audited its internal security".

However, while agreeing that such baseline standards are positive, Abed warns that they aren't healthcare specific. Ultimately, "accreditation is only one step in a complex process to effectively manage risk".

Supply chains are more vulnerable than ever, which presents a particularly tricky challenge for the NHS. Ultimately, asking difficult questions of the wider supply chain is essential to prevent weak links.

"Further investment in auditing suppliers and supporting local procurement teams" will have a significant impact, along with ensuring accountability, Abed concludes.

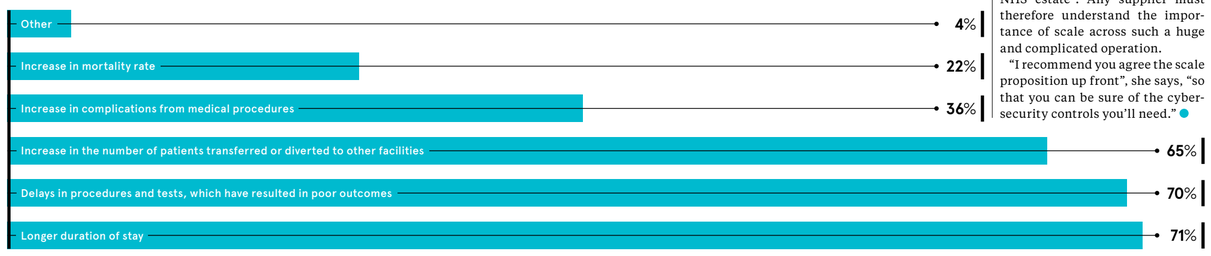
As for the suppliers themselves, Taylor advises that without NCSC Cyber Essentials accreditation, they "don't have a chance of understanding how to work across the NHS estate". Any supplier must therefore understand the importance of scale across such a huge and complicated operation.

"I recommend you agree the scale proposition up front", she says, "so that you can be sure of the cybersecurity controls you'll need."

THE EFFECTS OF RANSOMWARE ON PATIENT CARE

Percentage of IT professionals working at healthcare delivery organisations who say that ransomware affects patient care in the following ways

Ponemon Institute, 2021



Commercial feature

On the hunt for a single version of the truth

Digital leaders from public sector organisations discuss the enormous opportunities presented by data, and the biggest barriers they must overcome to get there, in a recent roundtable

Ben Rossi

Data has the power to transform the delivery of services and vastly improve outcomes for and the experience of customers. In the public sector, it holds the key to better innovation, decision-making and a more connected customer experience, whether that 'customer' is a citizen, patient or student. This has caused the government to publish a National Data Strategy, which sets out a vision to accelerate and futureproof the UK's digital economy by unlocking the value of data.

To unlock that value of data in the public sector, however, there are hurdles to overcome, which were discussed at length in a roundtable discussion sponsored by specialist STEM recruiter and project services provider Real Public Sector on 24 November. Success in the private sector has long been driven by a relentless desire to keep up with consumer demands; an intensity that has traditionally been felt less in the public sector. Yet the digital expectations of younger generations are changing that, and meeting those expectations relies on a single version of the truth which has yet to be achieved.

"Today's generation of students are digital natives and so the expectation of how they engage with us is very different to the past," Juan Villamil, CIO at Imperial College London, says. "To deliver a personalised, tailored service, you need quality data, simple ways of understanding it and robust data platforms. We had lots of data, but it was fragmented and broken, so it was crucial to create a proper data strategy, which we're now delivering against."

Disparate, legacy systems are a commonality across public sector organisations, which makes achieving a single version of the truth much more challenging. By amplifying the need for faster data, the pandemic increased the urgency with which organisations sought to deal with their legacy infrastructure; an infrastructure that was never designed to deliver the speed of reporting and flexibility required today. It is now widely recognised that the public sector must invest in updated infrastructure to make data more accessible and usable for the citizen and the organisations within the sector themselves.

"In the early days of digital, we managed and designed our way through complex legacy systems and created something that helped the citizen, but there was a lot of hard work in the back to make that work," says Brigid McBride, programme director, digital change at Ofsted. "Investing in legacy replacement is now critical in terms of embedding flexibility and agility into the business strategy as well as supporting digital and data strategies. You have to tell a story to decision-makers about how replacing legacy benefits the organisation."

To realise the opportunity of data in the public sector, however, institutions must not only overcome challenges to achieve a single version of the truth within their own environment, but also across third-party relationships, especially in government. Organisations have learned that data is crucial to connecting their various departments and business units, but realising a single, seamless citizen life journey will rely on an unprecedented level of alignment and collaboration.

A citizen's journey does not start and end with one institution. It traverses organisations as diverse as tax, education, work and pensions, welfare, health, justice and immigration. While these areas are historically separate, with their own operational silos, citizens wish to navigate all of them in a connected manner in which handoffs are, ultimately, invisible to them. The National Data Strategy has had a positive impact in creating a common vision for this ambitious end goal, but the hard work is in bringing that strategy to life to improve the citizen life journey.

"We're working with colleagues in other government departments to connect the data strategies where the journey traverses across those organisations," says Paul Lodge, chief data officer at the Department for Work and Pensions. "To streamline the citizen life journey, we need to understand more about their circumstances when they arrive and make sure their transition is straightforward, reflecting changes in their circumstances without them having to provide the same information multiple times, and facilitating an experience that is easier and less stressful."

Though initiatives like the Government Digital Service have set a benchmark for how public sector organisations should use data and think about customer experience, some fundamental issues remain.

One major barrier is the concept of a data strategy that is separate and discrete from a public sector organisation's core strategy is still prevalent. The general direction of travel is towards strategies in which data goals are embedded within the core objectives – and cross-organisational strategies are beginning to emerge – but a faster pace would be welcome.

> **Investing in legacy replacement is now critical in terms of embedding flexibility and agility into the business strategy... You have to tell a story to decision-makers about how replacing legacy benefits the organisation**

"You need to be able to think about services and the data across organisational boundaries," says James Freed, CIO at Health Education England. "I'm interested to see the formation of integrated care boards and integrated care systems in the health and care system which are deliberately intended to break down some of those organisational barriers and recognise that people sometimes get ill in more than one place and have care as well as health needs."

To reach this equilibrium, public sector organisations must create a strong data culture, which is evidenced by widespread recognition that data can contribute to core outcomes and improve the customer experience. Continued separation between data strategy and business strategy indicates an absence of a data culture, though the pandemic has at least accelerated an appreciation of the need for data, digital maturity and expertise at the senior leadership level.

Appreciation of the need for data and digital expertise, at all levels, may be higher than ever, but the biggest challenge of all is attracting the talent to provide that expertise. All sectors are suffering from a digital skills gap, but it can be even more difficult for public sector organisations which typically cannot compete with other sectors on salary demands.

That's not to say, however, that they can't compete in the jobs market. Salary capability aside, public sector organisations have what many businesses lack. Younger generations increasingly crave a sense of mission and purpose. Much of the best digital talent today are attracted to the personal fulfillment that can be gained through a direct, meaningful connection to citizens. Public sector organisations must understand how they can leverage this opportunity.

"Acquiring the talent to execute on data strategy and objectives is a challenge when there is a deficit of skills in the UK and organisations in the public and private sectors are competing for talent," said David Elliott-Smith, director of managed services at Real Public Sector. "However, there are ways the public sector can win. We are a major supplier of STEM talent and project services, and we are dedicated to supporting public sector organisations to amplify the noble mission they are on, help their workforce planning and futureproof demand through setting up a people strategy."

For more information, visit www.realstaffing.com


Paul Scott/EyeEm via Gettyimages

TRANSPORT

UK embraces technology in railways shake-up

The government hopes a new plan will entice commuters back to the railways. The tech-focused overhaul could also benefit industry

Heidi Vella

Failed franchises, disastrous timetable updates and a gaping north-south divide: Britain's railways regularly receive bad headlines. But it is the most recent crisis – plummeting demand owing to the pandemic – that's been credited with prompting a long-awaited government overhaul of the flagging system.

The *Williams-Shapps Plan for Rail*, outlined in a white paper in May, hopes to lure discontented commuters back to the railways, while also furthering Westminster's so-called levelling-up agenda, which aims to at address inequalities between the north and south of the country.

The shake-up scraps the current franchising system and replaces it with a new centralised public body – Great British Railways – which will run most aspects of the network, including fares and ticketing.

"This is an opportunity to unpick some of the complexity behind the running of the railways," explains Simon Moorhead, chief information officer at the Rail Delivery Group (RDG), which represents rail passenger, freight and infrastructure companies. "It can then be stuck back together in a more efficient and customer-focused way, helping the industry to grow post-pandemic."

Since British Rail was privatised in the 1990s, the system has largely consisted of dozens of fragmented organisations, each with silos and priorities that rarely work together.

The new plan shifts away from this disjointed approach. While it doesn't go as far as renationalisation, it introduces a more centralised and coordinated system. Train operators will no longer be revenue-based but simply paid to run a service.

Although the white paper lacks much detail on the specific 'how' aspects of the overhaul, the plan clearly aims to foster technological innovation, such as integrating different technology systems and services such as ticketing.

The government recently announced an investment of £360m to roll out pay-as-you-go ticketing across the midlands and north over the next three years. The understanding is that eventually this could be streamlined across the entire country as part of an effort to end complex pricing structures.

Given that fares will be set by Great British Railways, rather than train operators, this should be feasible. But it will mean working with other, more localised services, such as buses, for example.

"This is not technologically difficult. We already have mechanisms by which smart card use is allowed across the nation," Moorhead says. "But first we must agree on a fair system and common rules, whether it be regionally or nationally. This will enable us to properly integrate smart ticketing technology."

240,000+

people are directly employed by rail companies in the UK

£150bn+

invested by the government in rail since the mid-1990s

50% of all public spending on transport goes to rail

Department for Transport, 2021

Other reforms are also exciting the industry. Since privatisation, passenger data has been a closely guarded secret owing to its commercial sensitivity for franchising. But, under the new plans, most rail data will soon be open by default. Having access to this information could significantly improve the running of the railways, incentivising travel at quieter times and the development of new services.

Transport for London (TfL) – a national leader in smart ticketing – has been publishing open-access data for a decade. An independent review found the information has informed more than 600 apps used by 42% of Londoners and generated annual economic benefits and savings of up to £130m for travellers, for London and for TfL.

RDG, which is learning from TfL, plans to set up a £5m rail data marketplace, a single-access data platform. Information access and increased digitisation is also expected to improve infrastructure maintenance, management and construction services. It could benefit suppliers, too: they could use it to create new value propositions.

Jake Cartmell is a senior consultant and head of policy at engineering services company Ricardo. He previously worked on the Railways Act 2005 and with the Department of Transport. While the railway network already has many systems in place that can communicate with each other and collect data, he believes that streamlining this work across regions will be a challenge. But it will provide economies of scale and better data collection.

"For different regional networks, a common technology approach, rather than several different connected interfaces, would create savings when buying systems or paying for maintenance," Cartmell says. It could also lead to data standardisation across the board, which could help the network to achieve the white paper's goal of making annual cost savings of about £1.5bn.

The *Williams-Shapps Plan for Rail* envisions continued work on digital upgrades for signalling systems. But the scale is different, says Ian Johnson, head of rail at WSP, an engineering professional services firm. The system is currently divided up into micro control areas. Under the white paper's proposals, these will be made bigger, increasing project complexity.

As legacy mechanical parts of the network are replaced and aggregated, Johnson thinks that tech such as digital twins – which use sensors and data analysis to model complex systems – will be adopted to create a single source of data while achieving fully simulated operations.

"Ultimately, shifting to completely computerised control systems – from traffic lights to in-cabin displays – will create more flexibility in systems and, eventually, increased automation, with a person remaining in the loop," he predicts.

The *Williams-Shapps Plan for Rail* could see a better, more streamlined national rail service that costs less to run, the experts agree. It is still uncertain whether or not these cost savings will be fed back to consumers. But, as the government looks to entice people away from more polluting forms of transport in line with its commitments on climate change, this is most certainly a possibility.

Cartmell also cautions that train operators that are no longer reliant on ticket revenue could start a "race to the bottom" as they look to bolster their profits with greater efficiencies and cost savings.

But the shake-up won't deliver much to further the government's levelling-up plan, given that a lack of services and infrastructure is the main problem facing the north and midlands. New regional services and capacity were announced as part of the follow-up *Integrated Rail Plan*. This delivered part of what northern leaders had asked for, but also cut key planned HS2 routes in the region.

> **This is an opportunity to unpick some of the complexity behind the running of the railways**

INTERVIEW

Vital resource: the web's creator on the future of data

Improved data literacy will encourage innovation – empowering citizens and easing global warming, according to Sir Tim Berners-Lee and Sir Nigel Shadbolt

Oliver Pickup

Billions of us use the world wide web as our primary tool to interact online. Today, its creator, Sir Tim Berners-Lee, is on a new mission: to ensure that data is used appropriately to create the public sector of the future.

Berners-Lee partnered with artificial intelligence expert Sir Nigel Shadbolt in 2012 to create the Open Data Institute (ODI). At the ODI's summit in November 2021, the pair of computer scientists warned that we are at a pivotal moment. As we hurtle further into the digital era, powered by data-hungry algorithms and AI, it's vital to collaborate with good intentions and maximise the potential of technology for the sake of the planet and its inhabitants.

The acceleration of digital transformation necessitated by the Covid crisis is exciting, but there is a responsibility on authorities around the world to keep pace with this incredible change. Those in power must set standards, encourage data to be shared responsibly and narrow the ever-widening skills gap. The quicker that data literacy in both private and public sectors can be improved, the better for everyone.

As Berners-Lee points out, the pandemic has boosted the public's awareness of how data can enrich and even save lives.

"Something that took off hugely was communication through data, with the government telling us to 'flatten the curve' [and limit the spread of Covid-19]," he says. "I would imagine that the data literacy of the general population has gone up a chunk."

By improving their data literacy, political leaders and members of the public could understand and challenge how data is presented, Shadbolt suggests. As public sector technology and its applications develop in the coming years, fuelled by more and better data, greater scrutiny will help to shape products and services for the digital era.

The opening of more data sources will supercharge the public sector of the future and drive innovation, Shadbolt says. The chair of the ODI – who has been principal of Jesus College, Oxford, since 2015, among other roles – points to the success of Transport for London (TfL) as a pioneer of open data. Often held up as an exemplar of this approach, TfL offers data feeds and guidelines about air quality, cycling, walking, planning and more.

In 2017, Deloitte calculated that TfL's release of data had generated annual economic benefits and savings of up to £130m for travellers, the capital and the organisation itself. Additionally, many private businesses have since taken advantage of the open application programming interfaces (APIs) it offers and cashed in on the opportunities.

"Imagine that a lot of data relevant to everything climate-related was just being routinely published using standard APIs," Shadbolt continues. "It's what we saw happen with TfL. And there's just a bunch of sectors and areas to go for."

But it can be dangerous to follow the data blindly. Shadbolt wonders whether Boris Johnson's refrain during the pandemic that the government would "follow the data" to justify its decisions sent out the wrong message.

"It was quite a bad phrase in some respects", he says, "because, while there should be a basic ability to understand the data, we need to interrogate and critique it."

Questioning data sources is not only essential to fighting fake news, on social media and elsewhere. It will also enable public sector organisations to build greater trust among citizens, Berners-Lee says.

With more connected data, they could trigger a shift from reactive to proactive services. This represents a virtuous circle, because trusted and high-quality datasets will widen the reach of public sector technology and empower citizens, he says, adding: "Provenance is important for data quality – and provenance is important for trust."

For instance, Berners-Lee continues, a doctor should be able to look at the digital notes of a person with diabetes and access a data narrative explaining how this diagnosis was made, along with other relevant history. Public trust in the data used by the public sector is absolutely crucial to the adoption of technologies and services.

During the lockdowns, the public seemed to fall into different categories regarding Covid-19 data, says Berners-Lee. Some accepted scientific recommendations for flattening the curve, but many others "don't listen to the same people as we might. Instead, they find groups of people – the conspiracy theorists – usually on social media, who make up all kinds of strange things about the pandemic – or vaccines or climate change, for that matter."

Shadbolt says that experts act in good faith with the information available at a specific time, but their scope is limited if they have scant amounts of data. The wider the variety of good-quality data sources, the fuller the picture.

"We've talked a lot about how it's important, particularly during the pandemic, not to regard the scientists, medics and people in white coats as telling you the whole truth," he says. "They're trying to give the best information, very often under conditions of considerable uncertainty." We must take a nuclear approach, he argues, understanding that the data "can be good, but it never gives a complete picture".

Those in the public sector and beyond must be "critically reflective" of data. "All our responses are made, in a sense, standing on the edge of error. But that's what science is: it can believe something is wrong and can revise what we believe as these things unfold."

While the collaborative use of data will create smarter public services in the UK, this approach is crucial on a larger scale if humanity is to overcome its biggest challenges. It's been vital in the response to the Covid crisis, while a cooperative, can-do attitude is also essential to reduce global warming.

"We've just been living through an existential crisis – a pandemic – and we're in the midst of another one unfolding, with the climate challenge," Shadbolt says. "Data will be an essential part of [solving this]: the infrastructure, the institutions we might need, the trust we have [in its use], and our literacy."

Sir Patrick Vallance, the UK's chief scientific adviser, echoed this view at the United Nations' COP26 conference on climate change. He warned that the challenge of global warming is a greater risk than Covid-19 and more people will die from it than the pandemic if the public sector doesn't act quickly. He also said the climate crisis could last 100 years and require "a combination of technology and behavioural change".

Shadbolt concurs, but he stresses that opening data and boosting cross-sector collaboration will accelerate meaningful change on a macro and micro scale and increase the capabilities of public sector technology. "While environment data is in the news because of COP26, there is other information that can help spur action," he says, hinting that greater transparency from public sector organisations will ratchet up the pressure on private companies to keep clean. For example, he notes that data on utility companies' sewage discharges will help the Environment Agency, which struggles with funds and support.

"We are starting to gain a sense of what data's going to make a difference – everything from emissions to insulation. There's a whole network of interconnected data types that we can bring together, much of it held in the public sector, and some of it held in the private sector," he says. "We need to begin that work on joint public-private enterprises, although we're starting to see the private sector, with its commitments to ESG, saying: 'We now need to have a public purpose as well as a private one.'" Publishing some of this data "would be a great first step", he adds.

Berners-Lee and Shadbolt were appointed as information advisers to the government in June 2009. The duo led the team that developed www.data.gov.uk, a single point of access for non-personal governmental public data. This offers real-time information on a range of topics, such as government spending, digital service performance, crime and justice, transport and more.

When the pair founded the not-for-profit ODI nine years ago, their mission was to "connect, equip and inspire people around the world to innovate with data". Almost a decade later, the ODI continues to provide free and paid-for training courses and learning materials both in house and online. These cover theory and practice surrounding data publishing and use. The ODI has long championed open data as a public good, but always emphasised that effective governance models are necessary to protect citizens.

> **Provenance is important for data quality – and provenance is important for trust**

Some 20 months since the start of the pandemic, people are beginning to appreciate both the ODI's work and its concerns about data standards, Shadbolt says.

"When the pandemic began, we provided a data publication template," he says. "The big challenge we faced was that so many people wanted to contribute data. It needed sorting and we had to determine what was helpful. If there were just a little more awareness about open standards to publish data, so that it's in a more interoperable format, that would be better for everyone."

For public sector technology to thrive, public trust is critical, says Berners-Lee, who notes a difference in attitudes to technology in the UK compared with the US.

"Typically, people in the UK trust the government and don't trust [the tech] industry, whereas people in the US trust the industry but not the government," he says. More should be done to assuage fears about how tech giants handle user data, he adds. "To an extent, this is about how people are brought up and is therefore cultural. But, for people in the UK to trust these large US companies, you need to have serious legislation and regulation."

The backlash against Facebook – which, according to claims by a recent whistle-blower, prioritises user engagement over safety – is a cautionary tale for public sector organisations seeking to embrace technology solutions and partner with third parties without fully knowing their policies on data privacy and other questionable values, Berners-Lee suggests. More than ever, at the outset, digital products must be "good by design".

Data management is integral to these processes. Here too Covid-19 has proved useful, testing the robustness of so-called trusted research environments.

"In these environments, the data stays behind a firewall and it's modelled and analysed with tools that can go behind the firewall," Shadbolt explains. "The data never actually leaves the highly secure data storage areas where 47 million patient records are linked, but incredible insights are gained."

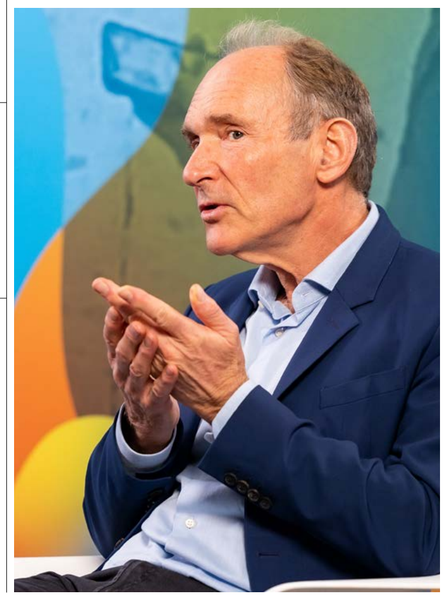
Offering an alternative, he says: "The other solution is to leave the data with the people who generate it, which is very local. There are different technical solutions there and there are different institutions we can build to share this. This is a complicated area, but the ODI is looking very carefully at making data-sharing more effective."

What does the future hold for the ODI as it nears its 10-year anniversary? "We started off explaining to people working in the public sector how to put your data on the web," Berners-Lee says. But now the ODI realises that it's "important to cover the whole spectrum, from public to private, but it's also about developing policies as well".

This assessment resonates with Shadbolt. "There is unfinished business," he says. "The whole commitment to getting data out there was started with open data initiatives that were very much focused on the public sector – everything from hospital data to educational data to transport data. That work has gone well. We're now looking at extending what we've learnt. As governments move on [in their digital transformations], you want to ensure that momentum is retained and that the infrastructure is there to help sustain publishing the data out."

Returning to the global climate crisis, he says of the ODI's mission: "We did anticipate that in trying to build a trusted research data ecosystem it would become one of the consequential questions for the future of the planet and the future of our wellbeing. There's a huge amount of work to do. We're trying to make sense of it in terms of programmes of work, from data literacy to institutions, from ethics to infrastructure."

Shadbolt adds: "Fundamentally the ODI's work is about listening. It's about trying to take ideas and put them in a format that allows scaling up. We may be an organisation of 60-odd people, but we think we can have a fantastic impact. So we need to reach out and sustain ourselves to make a better future."

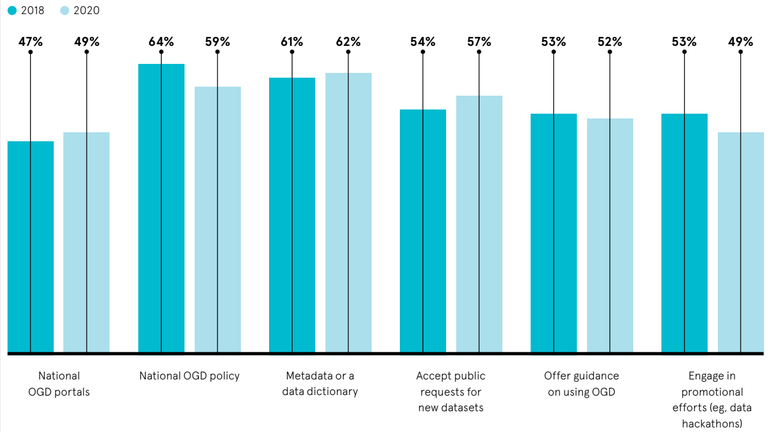


Sir Tim Berners-Lee spoke at the Open Data Institute's summit in November with the institute's co-founder, Sir Nigel Shadbolt

GOVERNMENTS EMBRACING OPEN DATA AROUND THE WORLD

United Nations, 2020

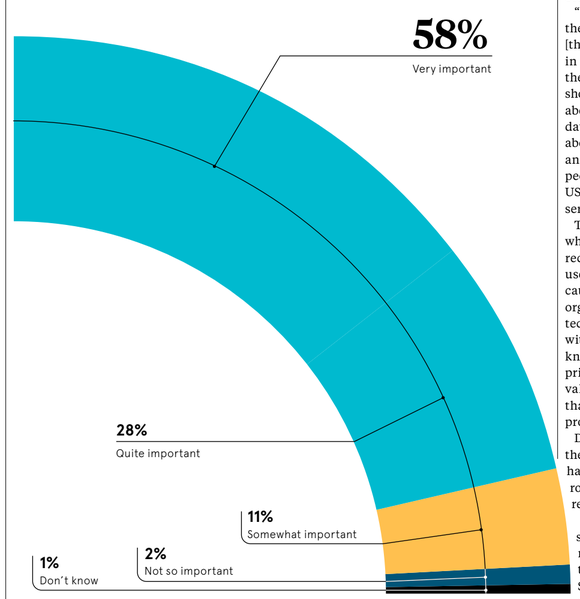
Percentage of UN member states which have the following associated features of open government data (OGD) portals



HOW COVID DEMONSTRATED THE IMPORTANCE OF OPEN DATA

Percentage of UK citizens who said that public access to open data relating to Covid-19 was important during the pandemic

Survation, 2020



The positive legacy of a crisis

Government departments have undergone rapid transformation over the course of the pandemic, which could lead to more citizen-centric services

Protecting the public from Covid-19 is a necessity for the UK government, and as history shows, necessity is the mother of invention. Keeping people safe has required fresh thinking, greater collaboration and increased funding for government agencies tasked with tackling the pandemic. In short, the Covid crisis has proved that the public sector can innovate and deliver just as quickly and successfully as the private sector. But can it still do so once the urgency of the pandemic period fades away?

It's a big question that can only be fully answered in time. However, there are clear lessons from the pandemic that could help to drive further change in the public sector. For instance, the need to act quickly helped to override the risk aversion that sometimes constrains public sector innovation. Existing resources were rapidly ramped up and decisions were made faster. This meant projects were delivered in timeframes that would have seemed impossible pre-pandemic.

One example is Spotlight, a Cabinet Office due diligence tool built on the Salesforce platform that checks grant applications and accelerates approval processes. It helped to unlock massive efficiency gains at a time when grants were key to the survival of countless companies and charities across the UK. "We'd [already] put the base technology in place, but very quickly it had to go from being a good idea with proven high-level concepts to distributing billions of pounds worth of grants," says Simon Collinson, head of UK public sector at Salesforce.

The rapid rollout of Ireland's vaccination programme is another example of how quickly things were achieved during the pandemic. Having realised their existing IT system was unlikely to cope with the scale and speed of the programme, the government decided to work with Salesforce on a solution. It needed to be created from scratch in record time, integrated with the Health Service Executive's systems, and rolled out to hospitals and care homes within weeks.

"We were able to move from early discussions at the beginning of December to a proposal in the middle of December to having the Irish government up and running on vaccination management by 9 January," says Collinson. He adds that this was only possible because the government was willing to rapidly shift from pre-baked ideas about its IT systems to a stance of "'I just need something that works.'"

Legacy issues

While digital transformation in the public sector undoubtedly accelerated during the pandemic, "a lot of this was around enabling existing tools and ways of working to become remote, so setting up VPNs, distributed call centres, etc.," says Paul Pick-Aluas, who leads digital transformation for EMEA public sector at Salesforce. His concern now is whether many of the changes will stick, as: "Once people get through a crisis, they tend to largely revert to the old way [of doing things].

"In certain agencies, they've seen a new way of working and will continue to push forward. But to me, the jury is still out on whether this is a milestone moment in the UK public sector – partly because of the critical mass of legacy IT that is still out there."

This mass of legacy IT is a serious problem for a government that was once considered among the most technologically innovative in the world. Initiatives such as G-Cloud, the Digital Marketplace, and the Government Digital Service's service design standards and principles were ahead of the curve. But the UN e-government ranking for the UK fell from 1st in 2016 to 7th in 2020, which shows that some of the momentum around digital transformation has been lost.

In particular, the government has struggled to deliver citizen-centric digital innovation that is efficient, trusted and focused on users' needs and preferences. For example, instead of delivering personalised, relevant messages across multiple digital channels or providing rich citizen-facing apps, many government agencies remain stuck in the era of post, print outs and PDF forms. Data-driven collaboration across departments for a 360-degree view of citizens is also a work in progress, along with the shift from one-off customer transactions to relationship management.

To truly improve service delivery, better experiences during the intake of a request and a clean, easy-to-use site must also be matched by the right business processes, technology and architecture in the middle layer. Pick-Aluas says this is a "critical gap" in the UK's overall strategy, and one of the reasons for the country's drop in the UN rankings.

Historically, a lack of relevant data and concerns around data privacy and security have also been a barrier to implementing truly user-centric services. However, "examples such as the NHS Test and Trace app show that people are prepared to let the government track their actions...in return for something that is going to be of benefit to them," says Collinson.

In fact, he believes that "a rubicon has been crossed" when it comes to the government's approach to citizen data and engagement. "I think that's one of the effects of Covid-19 which will, to coin the government phrase, allow people to 'build back better'."

Further funding

Funding for digital transformation is a perennial issue for government departments and public sector agencies. During the pandemic, this 'money problem' was swept away as the government strove to meet the urgent need for covid-related services and support. But as the country moves beyond the peak of the crisis and the government seeks to address huge levels of borrowing during the pandemic, could these increases in funding go into reverse?

"What we're witnessing now is actually that funding is continuing," says Collinson. "The government hasn't just reverted to austerity, and that provides a genuine opportunity to build a different set of outcomes going forward."

But although there hasn't been a slow down of spending yet, Pick-Aluas feels that there will inevitably be a shift toward greater austerity. "Somehow, sometime, the money needs to be paid back, and it will come in the form of budget cuts," he says.

This will undoubtedly impact IT, with the funding "haircut" likely coming from the modernisation budget. To continue transforming and innovating, organisation's will need to adopt cyclical processes that allow them to invest in modernisation, capitalise on the resulting savings in operational expenditure, and thereby free up further funds for additional investment.

There's a real need to audit value too – as demonstrated by tensions around spending on systems integrators (SIs) and consultants during the pandemic. Consultants and temporary staff can be an important source of skills for departments that need to rapidly transform. But specialist staff are also expensive, typically costing twice as much as their nearest permanent staff counterpart.

Much of the spending during the pandemic centred on plugging the digital skills gap that has long plagued the public sector. "We see a genuine skills shortage within the UK at the moment, and that presents lots of opportunities in terms of what you do to resolve that," says Collinson. For instance, he believes there's a real need to pull more non-technical people into digital programmes.

"Low-code platforms are great for doing that," he explains. Salesforce's low-code development tools, for example, can reduce the need for expensive hard-to-find skills. This ultimately "puts more control in the hands of service teams, which allows technical teams to focus on innovation," says Collinson.

Pick-Aluas adds that: "One of the real legacies of the pandemic is that government departments have needed to adopt low-code platforms, and so what you're left with is this scattering across government of lots of new technologies, and the ability to deliver and develop more quickly on those platforms."

Looking ahead, greater technical knowledge at the chief executive level is needed to keep driving the shift toward citizen-centric digital services, as well as more collaboration with partner ecosystems. Retaining the 'can-do' mindset created by the pandemic will also be a challenge as the crisis recedes into memory. But as the rollout of Spotlight and Ireland's vaccine management programme show, with the right funding, skills and partners, the public sector can deliver digital services and engagements just as rapidly and successfully as the private sector.

For more information please visit salesforce.com/uk/publicsector

Transforming lives with cloud employability services

The Department for Work and Pensions (DWP) – the largest public service department in the UK – has deployed a range of interventions to combat unemployment during the covid crisis, including the JETS Programme in Scotland.

Job Entry: Targeted Support, or JETS, provides support to unemployed people across Scotland that have received benefits for at least 13 weeks. The programme analyses transferable skills and supports CV writing, job searches, interview skills and confidence-building. Capita, the DWP's service provider, selected Salesforce and Venerate to create the platform, which was designed, built and mobilised in just 10 weeks.

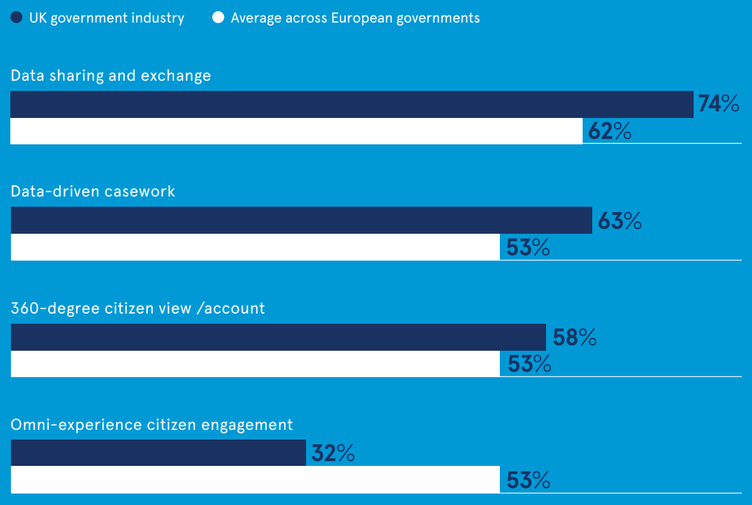
Capita knew the platform would need to provide support within an increasingly dynamic job search environment and changing employment sector. It also had to be user-friendly enough to work seamlessly across desktop or mobile devices, as well as capable of integrating with job posting systems and scaling up or down with demand.

"The Salesforce platform was market leading, available, flexible and could be deployed at really short notice," says Paul Dunphy, service delivery director for JETS in Scotland at Capita. "It had all the features that we needed in terms of being able to support the JETS program."

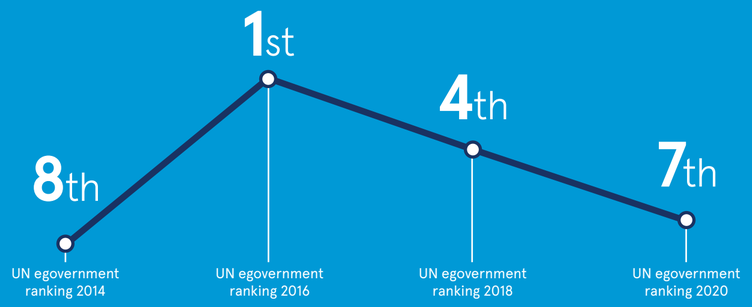
The Salesforce Customer 360 Platform for Government collates information on a job-seeker in a personalised record and recommends opportunities based on their profile – all while meeting GDPR requirements. Job seekers who have been out of work for at least three months are referred to JETS by the DWP and asked to sign up via a community portal built on Experience Cloud.

Within the first three months of going live on Salesforce, JETS handled an estimated 8,000 referrals. Dunphy says that without a trusted partner like Salesforce, it would ultimately have been difficult to achieve everything the programme needed to do. "We probably couldn't have launched a product that quickly that was going to be used by thousands of people from day one," he says, adding that: "It's not just a reliable platform; it's actually a very flexible platform that's given us a lot of additional functionality that we can build off."

GOVERNMENT PLANS TO INVEST IN DIGITAL TECHNOLOGIES



UN eGOVERNMENT RANKING FOR THE UNITED KINGDOM



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THE LEGACY TRAP

74% of UK government executives expect to spend the same or more on IT in 2021 than in previous years

38% of IT budget is tied to maintaining existing systems and a further 26% is committed to completing projects started before COVID, so only 36% is left for net new innovations

THE SKILL GAP

89% of European government executives think it will be moderately to highly difficult to acquire them in the next 6 months

8 months European government executives estimate they are 8 months behind schedule, due to skill gaps

> We were able to move from early discussions at the beginning of December to a proposal in the middle of December to having the Irish government up and running on vaccination management by 9 January

> One of the real legacies of the pandemic is that government departments have needed to adopt low-code platforms, and so what you're left with is this scattering across government of lots of new technologies, and the ability to deliver and develop more quickly on those platforms

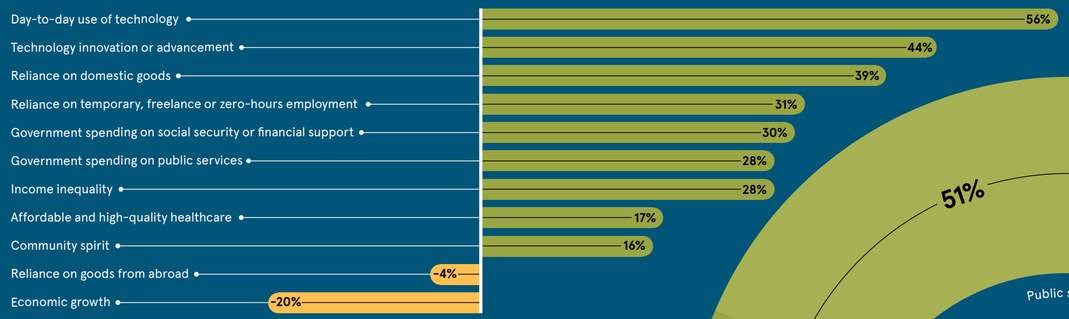
CONNECTED CITIZENS

As the pandemic initially drove many of us indoors and online, it turned British citizens into infinitely more tech-savvy consumers. But is the public sector keeping up? As people increasingly use digital technology to work, shop and socialise, they are yet to engage fully with public services through online channels. So where and why are public services still struggling to go digital?

DAILY USE OF TECH HAS SHOT UP AS A RESULT OF THE PANDEMIC

EY, 2021

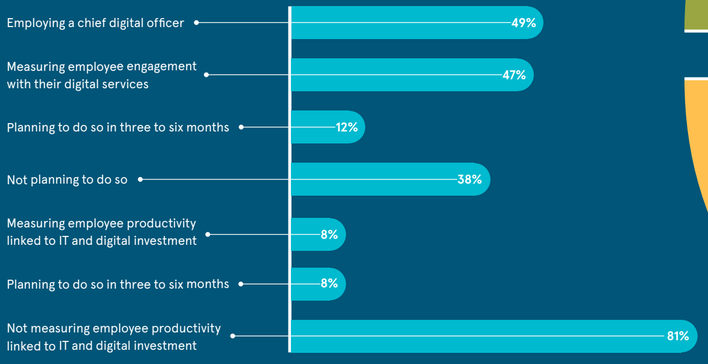
Percentage of global citizens who think there would be more or less of the following things in the future, owing to the Covid crisis. Tech tops the list, but there are high expectations for government spending too

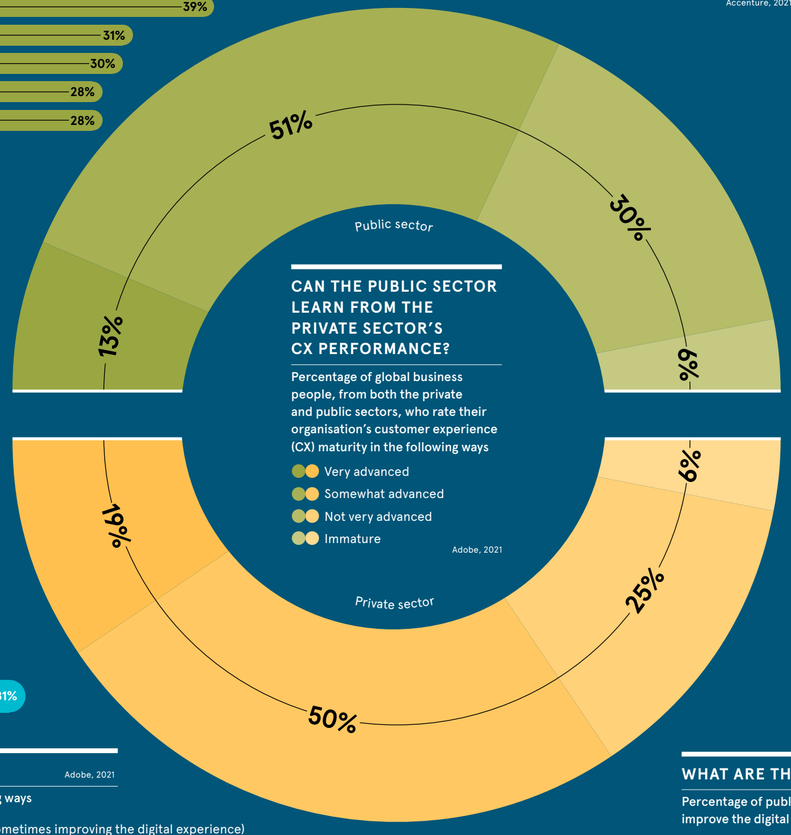


LOCAL AUTHORITIES ARE NOT PRIORITISING DATA AND DIGITAL TECH

Citrix, 2021

Percentage of UK local authorities





CAN THE PUBLIC SECTOR LEARN FROM THE PRIVATE SECTOR'S CX PERFORMANCE?

Percentage of global business people, from both the private and public sectors, who rate their organisation's customer experience (CX) maturity in the following ways

- Very advanced
- Somewhat advanced
- Not very advanced
- Immature

Adobe, 2021

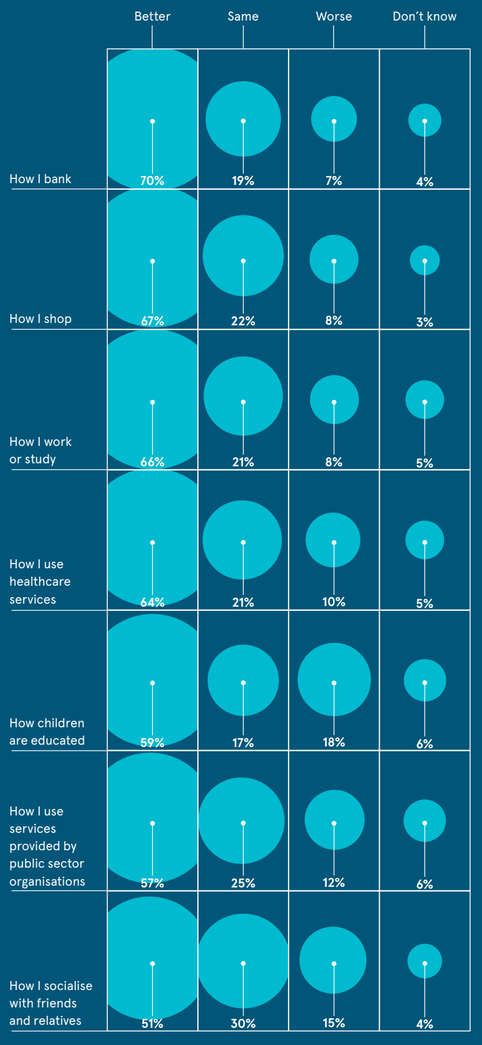
of public sector leaders agree that their organisation's business and technology strategies are becoming inseparable, even indistinguishable

Accenture, 2021

THE PUBLIC SECTOR IS SEEN AS A LAGGARD IN TERMS OF USING DIGITAL TECH TO IMPROVE SERVICES

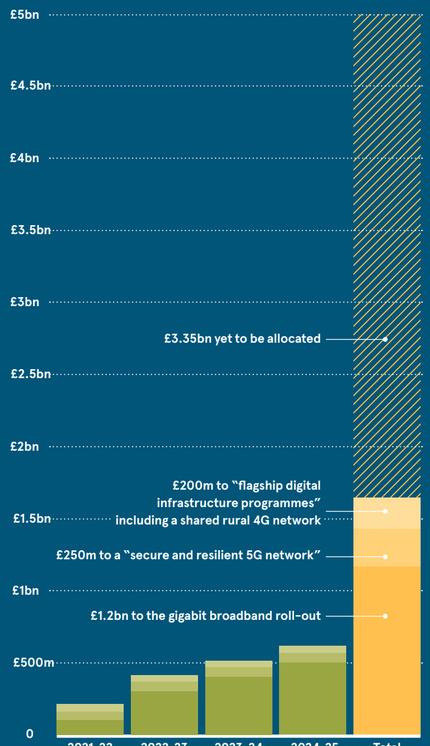
EY, 2021

Percentage of global citizens who say that technology will change how they do the following things – and whether they think those changes will be for better or worse



A SIGNIFICANT INVESTMENT IN CONNECTIVITY

In its November 2020 spending review, the government committed £5bn to upgrading the nation's digital infrastructure – a programme that's expected to run to 2025. But the Department for Digital, Culture, Media and Sport has allocated only £1.65bn of this so far



Public Policy Projects, 2021

91%

of public sector leaders agree that their organisation needs to 'fast-forward digital transformation with cloud at its core'

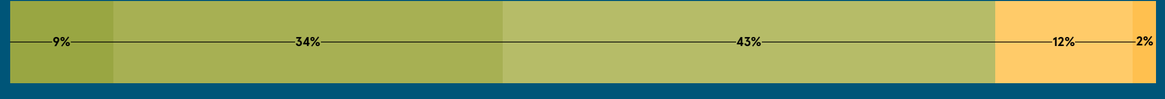
Accenture, 2021

HOW DOES THE PUBLIC SECTOR RATE ITSELF?

Adobe, 2021

Percentage of public sector business leaders who rate their organisation's digital experience record in the following ways

- Excellent (always improving the digital experience)
- Good (often improving the digital experience)
- OK (sometimes improving the digital experience)
- Poor (often failing to improve the digital experience)
- Terrible (never managing to improve the digital experience)

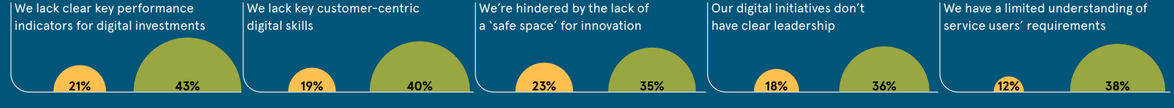


WHAT ARE THE BIGGEST CHALLENGES?

Accenture, 2021

Percentage of public sector leaders who agree or strongly agree with the following statements about the problems facing their organisations when working to improve the digital experience they offer to users of their services

- Strongly agree
- Agree



Anadolu Agency/Contributor via Getty Images

ALGORITHMS

Algorithmic gymnastics: getting into a black box

As the use of automated decision-making systems permeates the public sector – affecting the lives of millions – it's crucial that these powerful technologies are made more transparent, accountable and trustworthy

Peter Archer

Algorithms have the potential to wreck lives. Take, for instance, the fiasco surrounding 2020's A-level results in England and Wales, when many thousands of students who'd been unable to sit their exams rebelled against the unfair grades they had been assigned by a flawed algorithm.

Despite this, algorithm-based artificial intelligence (AI) systems are powerful tools that could radically improve the work of many public sector organisations. They offer new possibilities for the delivery of many services, advances in healthcare research, efficiencies in the labour market and the personalisation of online services.

According to the Ada Lovelace Institute, an independent research group that monitors the use of data and AI, algorithm-based decision-making systems are being deployed at an unprecedented speed in both the business world and the public sector. They are becoming ubiquitous, embedded in everyday products and services.

But their 'black box' nature – the opacity with which they are being designed and used – indicates an absence of human control and responsibility, ringing alarm bells. This lack of transparency undermines trust in algorithm-based decision-making and the organisations that use such processes.

Of particular concern to the Ada Lovelace Institute is "the expansion of algorithmic decision-making systems across the public sector, from AI 'streaming tools' used in predictive analytics in policing to risk-scoring systems to support welfare and social care decisions".

There is a widespread lack of understanding about where and how such technology is being used, notes its associate director of public and social policy, Imogen Parker. Public sector organisations need to address this matter urgently if they are to engender more trust in their decision-making processes.

Although the Ada Lovelace Institute knows that "data-driven tools are being used to match people to the right services, assess visa applications, predict risk and even escalate families into children's social care, we have a paucity of information about the public sector's use of algorithms", she says.

The government is at least piloting a transparency register for algorithms and consulting on whether this should be made mandatory. It is also committed to publishing a white paper on AI regulation early next year.

"Greater transparency is only the first step towards accountability," Parker stresses. "The ultimate goal must be to create systems that work for people. We need mechanisms that would involve people who are affected by these systems in developing and deploying them; in assessing their risks and impacts; and in enforcing sanctions as robust regulators who can pass judgement where needed."

Stian Westlake, CEO of the Royal Statistical Society, agrees that all organisations using complex algorithms need to win the trust of those whom their decisions will affect. They can start doing this by being clear about their intended uses for the technology.

"Trust can be harmed when opaque algorithms are used without good-quality data behind them," he adds, stressing that local authorities and other public bodies should carefully assess the datasets they plan to use.

"Government data can be biased or simply wrong," Westlake notes. "It is also a good idea, as the Office for Statistics Regulation has suggested, to test the acceptability of the algorithm with affected groups. Public sector organisations should be able to explain how conclusions are reached in individual cases, not just fall back on 'computer says no'."

79%

of government executives say they are confident in AI's ability to reduce bureaucratic inefficiency, yet only

53%

say they have implemented ethics policies for AI

KPMG, 2021

> "Public bodies should be able to explain how conclusions are reached in individual cases, not just fall back on 'computer says no'

Six steps to best practice

How can public bodies avoid pitfalls when implementing powerful AI-based systems and ensure that they treat everyone fairly? Here's a simple checklist:

1. Be transparent about your aims.
2. Assess datasets carefully.
3. Test the algorithm with affected groups.
4. Fully explain decisions.
5. Be accountable.
6. Cooperate with regulators and independent audits.

Parker adds: "We're seeing a trust deficit in how data is being used. We've had the A-level protests and the successful legal challenge to the use of facial-recognition technology by police in England and Wales. And more than 3 million people opted out of sharing their medical information as part of the government's General Practice Data for Planning and Research framework."

The A-level protests and the government's U-turn in response show that there can be no algorithmic accountability without a "critical audience" that can communicate effectively with policy-makers. So says Dr Daan Kolkman, a research fellow at the Eindhoven University of Technology.

He suggests that a formal critical audience could take the shape of a publicly funded independent watchdog that can draw on technical expertise to investigate systems, report in the public domain and, if necessary, provide redress to parties it deems unfairly disadvantaged by poorly designed algorithms.

Kolkman stresses that algorithms are only as good as the data they are fed and are inherently biased because people are. AI systems are trained on historic data patterns, many of which incorporate social inequalities and are therefore at risk of perpetuating such inequalities. He quotes renowned British statistician George Box's cautionary words in saying: "All models are wrong – although some are useful."

This is a widely acknowledged problem, which programmers have sought to address by making their algorithms more explainable. But, as Parker notes, "you can work to correct some technical biases, but there will always be biases. The key questions are whether those biases are legally acceptable and whether developers and public sector organisations are anticipating and mitigating them where possible."

She adds that "bias can even arise where the data is of a high quality and 'accurate', because an algorithm encodes structural inequalities in society into the future and amplifies them. A good example of this is a hiring algorithm that gives high scores white men seeking senior jobs because it has learnt that they are historically the successful candidates for such roles."

OPINION

'SMEs are more than capable of meeting government requirements – and the benefits of using them have to be recognised'

We all know that small businesses have the potential to transform the delivery of public services with their agile and innovative nature, but the public sector tech market remains a difficult place for them to operate in. They are all too often overlooked by government buyers. Despite making up more than 99% of businesses in the UK, they face several barriers that prevent them from effectively accessing this marketplace.

This is not to say that the government hasn't been trying to improve matters. Its commitment to helping more SMEs access this market over the years is clear. Examples include the target of spending £1 in every £3 of its annual tech budget on SMEs by 2022, the opening of the Digital Marketplace, the appointment of departmental SME champions and the creation of the role of Crown representative for small businesses.

While we have seen some improvements, there is still progress to be made and the government must work harder to harness SMEs' potential. This is why we at techUK publish our annual *GovTech SME Survey*, sharing the experiences of SMEs that work, or aspire to work, in the public sector. Its findings are used to develop recommendations to promote innovation in government technology, improve access to the market for SMEs and ensure a smoother procurement process.

As part of our sixth annual survey this year, we engaged with more than 100 SMEs between January and March. We found that 65% of the respondents felt that the Digital Marketplace – the online platform that enables public sector organisations to search for people and technology for digital projects, making opportunities in the sector more visible – is continuing to help SMEs gain access to the market. The equivalent figure in 2020 was 60%. We hope that the Digital Marketplace will keep flying the flag for SMEs.

But 92% of respondents told us they didn't believe that government buyers have a sufficient understanding of how small businesses could satisfy their needs. Unfortunately, this percentage has been increasing for the past three years. SMEs are more than capable of meeting government requirements, which is why the benefits of using them have to be recognised.

Moreover, the challenges faced by SMEs trying to access the market remain largely unchanged. It is imperative that these are addressed – and the public sector has work to do in providing SMEs with more assurance. This year's survey identified a risk-averse culture in the civil service, too many frameworks and a lack of meaningful early industry engagement as the top three barriers.

Despite the enduring obstacles, the survey did reveal that 40% of respondents feel that the government has acted effectively on its commitment to helping small businesses break into the market over the past five years. This is reflective of the signs of improvement that we have seen recently, and of the government's sustained efforts, but the percentage is still low. The government must keep things moving in the right direction; work to understand SMEs' capabilities; recognise how these can meet its needs; and start to address the big challenges that SMEs face.

Selling to the public sector continues to be an onerous process for SMEs, whose trust in the government is limited. Based on the findings of the *GovTech SME Survey*, techUK has developed six recommendations for the government to help improve the situation and enhance SMEs' chances of accessing the market. It can and will improve in time, but there is no magic wand.

TechUK continues to strive to represent the voice of SMEs to the government, so we welcome the thoughts of small businesses in the tech sector. If you'd like to contribute, please get in touch. We hope that, with the help of our recommendations, the government will be able to keep striving for the next leap forward in making the public sector technology market more accessible for small businesses. ●

Julian David
CEO, techUK

SUSTAINABILITY

Does space hold the key to the climate crisis?

Space agencies around the world are investing in climate technologies, with the potential to transform government efforts. But there are challenges ahead

Sanjana Varghese

The United Nations' COP26 summit last month pushed climate change further up the international political agenda, making the problem a primary concern for governments and companies around the globe. But could the solutions lie beyond our planet?

As national leaders convened in Glasgow, an unlikely UK government body provided a glimpse into a relatively untapped sector that may hold many of the answers: space. The UK Space Agency has announced a series of new climate-focused programmes, joined by its counterparts in other countries and several universities.

Space agencies already play a significant role in helping us to better understand how the Earth's climate is changing. For example, more than half of the data collected by climatologists every year is obtained using satellites.

"Satellite data allows us to understand the world and how quickly it's changing. We can't send people to measure the ice caps every 10 days and we can't measure in situ across all oceans," says Beth Greenaway, head of Earth observation and climate at the UK Space Agency.

The use of satellites and space-based monitoring instruments is a relatively recent development, but these changes in climate technology will have a significant impact on the policies that governments can pursue to mitigate the damaging effects of global warming.

"When we first started monitoring the climate, we didn't have the space technology that we possess now," says Dr Helen Brindley, a professor in Earth observation at Imperial College London, whose work focuses on diagnosing climate impact. "The first observations – from almost a century ago – simply involved looking at the skies. We moved to ground-based observation methods and then to monitoring using instruments, along with balloons."

Satellite monitoring makes it possible for policy-makers to gain a more detailed understanding of various sustainability scenarios. This should help them to direct investments to those areas where they can make the most difference.

Although space provides a new frontier for understanding the environment, Brindley stresses that ground-based observations and the in-situ monitoring of dryness and humidity levels – or specific greenhouse gas emissions – remain vital.

"Space-based programmes are, in essence, measuring energy leaving the Earth in some shape or form," she says. "Ground-based networks are crucial at actually measuring the quantity of what it is you're interested in, even if those ground measurements can't provide you with global coverage. It's a completely synergistic approach."

Public-private partnerships are a significant part of the growing space economy. Businesses are getting heavily involved in providing instrumentation and links to academia, where exciting research can fuel new initiatives.

One of these is MicroCarb, a joint venture between the UK Space Agency and other leading names in the private sector, including the Thales Group. Announced in November, it will use satellites to monitor CO_2 emissions in the atmosphere and evaluate carbon sinks such as forests to help scientists understand how climate-change policies can be better targeted.

"This is not a generic mission that's focused on global coverage. Instead, it hones in on a particular set of data," says the CEO of Thales Alenia Space in the UK, Andrew Stanniland. "We are modelling not only what we're doing to harm the planet, but also what we could do to heal it."

MicroCarb is one of several UK Space Agency initiatives in this field. Another is Traceable Radiometry Underpinning Terrestrial and Helio Studies (Truths), which will be the first space-based climate observatory, driven mainly by the UK but with the hope of affecting climate change internationally. The Truths initiative will be the first project to measure and test the calibration of all space-based instruments. This should ensure that, even as these instruments degrade, the data they send is as accurate as possible.

Other UK Space Agency projects include Biomass, which aims to build 3D images of all the Earth's forests. While these missions work in different arenas and many won't be fully operational for at least another decade, it's hoped that they will eventually feed into each other.

The whole endeavour depends on international collaboration. While a Chinese satellite mission may have a completely different focus from that of MicroCarb, for instance, the information gathered by both can be used together to inform new initiatives. MicroCarb is a joint venture between the UK and French agencies, while Truths builds on atmospheric data collected by Nasa instruments.

> No one person, company or government could measure everything on Earth

£16.4bn

The annual turnover of the UK space sector in 2018-19

45,000

The number of jobs supported by the UK space sector

UK Space Agency

"What's important is that the data can be interoperable," Greenaway says. "No one person, company or government could measure everything on Earth, but the critical thing is that this data is trustable."

The agency is hoping to "inspire the next generation of people working on this technology to come into the space sector", she adds.

The growth of the sector also creates new issues – for example, establishing whether the data collected is sound or how long projects can be expected to last. There are also questions over the potential for 'space junk', with satellites further polluting the outer atmosphere. Such challenges are very real. Nonetheless, there's growing excitement and enthusiasm in both the public and private sectors about the possibilities for the rapidly expanding space technology ecosystem, as government ministers around the world return from Glasgow with heightened climate-based ambitions.

"We're expecting to see a lot of investment in our area after COP26," Stanniland says.

He adds that MicroCarb should enable the more active governments to hold their co-signatories to the Paris accord to account if they are failing to move quickly enough. "But, in order to do that, the first step is to measure the changes, so that eventually we can all act."

Prevention rather than cure: transforming digital health and care in the NHS

The pandemic necessitated greater collaboration to achieve fleet of foot within the NHS. The change prompted numerous digital solutions to be developed with trusted ecosystem partners, but more work now needs to be done to empower patients

Oliver Pickup

The UK is bracing itself for more restrictions to halt the spread of coronavirus, due to the emergence of the omicron variant. At the same time, a record 5.83 million people were awaiting non-emergency hospital treatment at the end of September, plus the drastically revamped health and care bill is on course to pass into law by April 2022.

Addressing the challenges inherent in the sector with regards to digital solutions and transformation, ServiceNow sponsored a timely virtual roundtable that explored the challenges and opportunities in the future of public healthcare.

Q How has the pandemic transformed digital care for the NHS?

SF It has pretty much changed everything, from mobilising our workforce to enabling them to work from home, and kitting people out with the technology required for that. Additionally, it has changed some of our fundamental primary healthcare systems, and we have built new systems – for example, to rollout vaccines – very quickly. We have done an enormous amount to protect citizens and front-line medical staff using digital technology, with the development of smartphone apps and other tools.

FE The way we work together across all parts of the health service – local authorities, hospitals, primary care and community mental health – has been transformed to achieve fleet of foot. We weren't this agile two years ago, and this sense of team helps progress. In clinical practice, we have fundamentally moved to a mixed approach of virtual and face-to-face consultations. These changes and the deployment of more technological processes are not without their challenges. But we have been working with the public to help with the transition.

HT Teamwork and collaboration have been critical in response to the pandemic. We met with key stakeholders almost hourly at the start of the crisis. There was a battle rhythm, and we used our collective powers to problem-solve quicker. Suppliers stepped up, too, making it possible to procure or develop services and systems at pace; not the normal circumstances you experience when procuring national systems for the NHS. You just had to get on with it. As such, we deployed a contact tracing system in only 40 days. Now, the demand for digital services from patients is evident. The pandemic moved the digital agenda forward a decade.

WO From GP-level right the way through to multidisciplinary teams, there was a demand to implement and scale digital platforms at speed. It sparked some incredible co-creation and innovative programmes, such as track and trace and the Scotland vaccination programme, which ServiceNow delivered within six weeks. This partnership enabled 2.5 million vulnerable citizens to receive their vaccination in the first 14 weeks. We went from a state where programmes that would have traditionally taken years, now take weeks. There is now a digital front door, meaning the speed of adoption for digital platforms has been exponential during this time.

Panel

Fiona Edwards, accountable officer and chief executive, Frimley CCG and Frimley Integrated Care System

Steven Flockhart, director of cloud engineering and digital operations at NHS National Services Scotland

Will Owen, director of healthcare, ServiceNow

Helen Thomas, CEO, Digital Health and Care Wales

Q How are collaboration and partnerships with technology experts driving digital transformation for the NHS?

SF The pandemic helped to break down barriers and drove collaboration and camaraderie. Fourteen local health boards in Scotland operate autonomously, but there has been no difference in opinion by taking a user-centric approach. At the start of the pandemic, perhaps we underestimated the country's digital maturity. Uptake for apps – vaccine status, for example – has been massive. At the development stage, though, we have to adopt the 'fail fast' approach and learn from solutions that don't quite work. We now have regular, healthy conversations with counterparts across all four nations to share knowledge and best practices.

FE Clearly, tech partners are crucial. Our trusted partner, with whom we have built a relationship over several years, takes us into a more experimental domain with their expertise and competence. It is essential to give time, effort, and resources to build co-designed and co-owned projects that benefit all residents in our care. It is vital to have that mindset as a partner and a provider. We must be prepared to have an open and connected system that allows for more things to be built on top that will enrich and empower the lives of citizens.

WO The secret is not to try and solve a complete problem; think small with tech solutions. Technology platforms can be the answer in most cases, but it's really about use cases. As a first step, we sit down and engage with our customers and work out, from a patient experience or clinical productivity perspective, what it is we are trying to achieve. Work backwards from that. In most scenarios, strategic partners within your ecosystem will have the digital capability you need to deliver a programme successfully.

HT For digital progress, it is all about creating that ecosystem. In Wales, we take a hybrid approach to solutions and services and use an open-architecture model. The big thing for me is that it puts standardised data at the heart of the architecture. Patients and clinicians can access that information in real-time. Before the pandemic, whilst lots of digitisation had occurred, not much had changed since the the 1948 NHS model, with a continued reliance on the paper record. We are moving to digitalisation, which starts with redesigning our services – and that's an exciting dynamic – but its evolution relies on trusted ecosystem partners.

Q What will the digitally focused NHS of the near future look like?

WO There has been success with remote consultations, but more needs to be done to create a similar if not better experience than face-to-face meetings. There also needs to be better interoperability between video conferencing platforms and more robust, scalable solutions. We will also see more medical apps, which will help grow and create more experiences and services for patients. We need to expand those omnichannel capabilities and ensure we are reaching everyone within the care system. From a clinical perspective, there are so many manual, labour-intensive processes that can be automated.

FE There needs to be a long-term ambition and a commitment to achieving that ambition. We have an opportunity to take a radical change in approach and test new services. If successful – such as earlier diagnosis of dementia, or remote monitoring – we should scale them. The banking industry is a good comparison. It was forced to change and digitise. Further, by creating a common data pool will support anticipatory care.

SF Interestingly, we have been able to offset more than 20m miles of patients travelling to see healthcare professionals through our Near Me video conferencing solution. With the push for more sustainable solutions, this shows the direction of travel. Open banking is an excellent example of what is possible in healthcare. In terms of data privacy, recent legislation passed in Scotland, which gives power to citizens to opt in to sharing information, has made our lives easier. That authority allows us to innovate more.

HT Government support certainly helps progress, and in Wales, there is a policy called Prudent Healthcare, which is very much about co-production and co-designing with the patient, so they take ownership of their health and care. Technology's not a blocker to achieving this; for this to happen at pace, we need the development of standards to move data around and work in partnership with other areas of the UK. Once the right safeguards are in place, we can put the data and apps into the hands of the patients to empower them.

> Teamwork and collaboration have been critical in response to the pandemic. We met with key stakeholders almost hourly at the start of the crisis. There was a battle rhythm, and we used our collective powers to problem-solve quicker

2.5 million

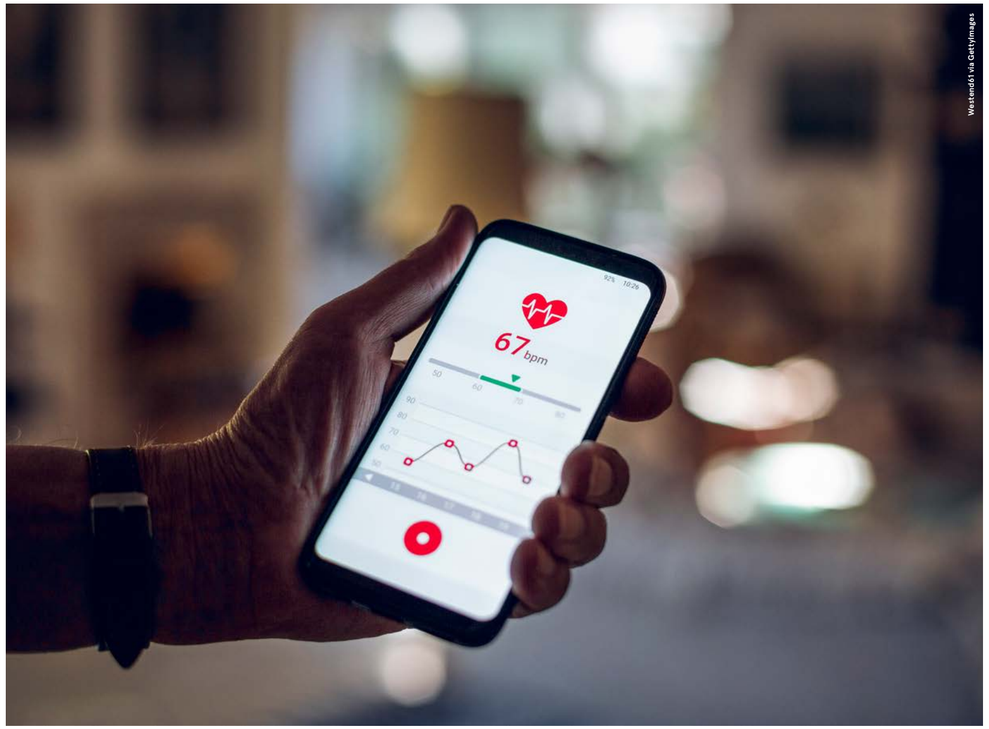
vulnerable citizens received their vaccination in the first 14 weeks of the Scottish vaccination programme

ServiceNow, 2021

ANALYTICS

The healthcare data-sharing conundrum

The sharing of medical information can accelerate the drug-discovery process and boost other healthcare innovations, but public trust issues stand in the way



Westend61 via Getty Images

Rich McEachran

Data-sharing has been vital for healthcare planning and research in tackling Covid-19. Looking beyond the pandemic, the wealth of data and insights our bodies offer can aid drug discovery and the development of medical technologies.

But there's a problem: a significant reluctance among the public to allow medical enterprises to share their health data. A June 2021 survey by the Information Commissioner's Office (ICO) and Harris Interactive found that only 47% of people would allow the NHS to pass on their data to public sector organisations if it were used to improve the delivery of healthcare. For private sector organisations, the figure was 42%.

It's no surprise that a good proportion of us have reservations. Everyone hopes that their data is shared appropriately and responsibly, yet 2,431 data-security incidents were reported to the ICO in the three months to the end of September. Of these, 435 were in the healthcare sector. Many more will have gone unreported.

> **We have robust mechanisms to ensure anonymity and the safety of patient data... There needs to be an education campaign to demonstrate this to the public**

There's already been a backlash against NHS Digital's new process for data held by GP surgeries: the General Practice Data for Planning and Research (GPDPR) data collection. Despite promises that anonymised data will be used only for healthcare purposes and not shared with marketing or insurance firms, more than 1 million people opted out of GPDPR over the summer. The scheme's implementation has been deferred twice.

The dilemma of whether to share healthcare data isn't isolated to the UK, of course. It's an endemic issue. A report published in *The Lancet* in October argued that countries need to strengthen public safeguards on the use of digital health data to avoid increasing inequalities in medical outcomes.

Any concerns that consumers may have had about sharing their data will have been exacerbated by the Covid crisis. Consider contact-tracing apps, for instance. NHS Test and Trace, which uses a web-based system called the Contact Tracing and Advice Service (CTAS), is ubiquitous on UK smartphones. Nonetheless, a research team at the Aalto University School of Business in Espoo, Finland, have found that people's income and education levels are often determining factors in whether they download and use such apps.

One of the researchers, Yanqing Lin, says: "We know that the effectiveness of CTAS depends highly on public acceptance and adoption, but it's been less accepted among those who are at a social disadvantage and may have a low level of trust in authorities."

Unequal access to smartphones and varying degrees of digital literacy are other factors deemed to influence a person's reluctance to share data. A common concern is that data will be used for more than mere infection control.

"Those with greater access to technology and who have a higher education and income tend to be more accepting of digital contact tracing," Lin adds.

The researchers have concluded that acceptance would probably be higher if CTAS were to use privacy features and/or decentralised data storage. Contact-tracing apps can be designed in different ways. Lin explains that some use a central database to store and process material, whereas a decentralised model enables personal devices to manage most of the storing and processing, with the central database playing a minor role.

Another issue in focus is how data is managed securely and who can access it. Some NHS trusts have been investigated in cases where employees have accessed patients' records without authorisation. Other trusts have accidentally leaked the names and birth dates of diabetes patients and the email addresses of HIV patients. Given people's understandable concerns about what might happen to their medical records, how best can the sector manage this data, especially when it's licensed to private sector organisations?

Louise Fullwood is a director and specialist in healthcare and data governance at law firm Pinsent Masons. She believes that one way to allay people's fears is to use what's known as a federated database rather than a centralised one.

When a centralised model is used, there's a greater chance that information will be misused or shared in such a way that people would not be happy about, says Fullwood, who worked in medical research before retraining as a lawyer. A federated model, on the other hand, brings the analysis to the data as opposed to moving big databases to licensees.

She cites the example of a drug company that wants to examine a healthcare service's database to gain a better understanding of potential causes of cancer. Granting it access to a big, centralised database presents risks. But under a federated model the database would always remain with the healthcare service.

"The drug company can interrogate the database using software to ask specific questions, such as: 'What proportion of men who regularly take drug X go on to develop prostate cancer?'" Fullwood says. "The company doesn't get access to individual datasets; it simply receives aggregated answers."

As medical science continues to advance, national healthcare services need to get a better grasp on data-sharing. Any failure on the part of healthcare services to allay the public's fears could have an adverse impact on treatment and outcomes for patients.

"We have robust mechanisms in place to ensure anonymity and the safety of patient data." So says Dr Steve Arlington, president of the Pistoia Alliance, a group set up by representatives of companies working in life sciences and pharmaceuticals, including Pfizer and AstraZeneca, to break down barriers to research and development. "There needs to be an education campaign to demonstrate this to the public," he argues. "This must communicate the wider altruistic value of sharing health data."

What the UK can learn from other countries

According to the Open Data Institute (ODI), the UK tops the European rankings of the quality and implementation of policies on the secondary use of health data. This is defined as the use of data to improve care planning and delivery, drug development, research and policy-making. But the country is lagging when it comes to the ethics of its policies.

As the ODI's 2021 research report states, "a successful ecosystem for secondary use of health data requires the trust of people and patients [and] ethical and accountability frameworks".

Here's what some other European countries that fare better on ethics are doing to improve access to, and control of, health records.

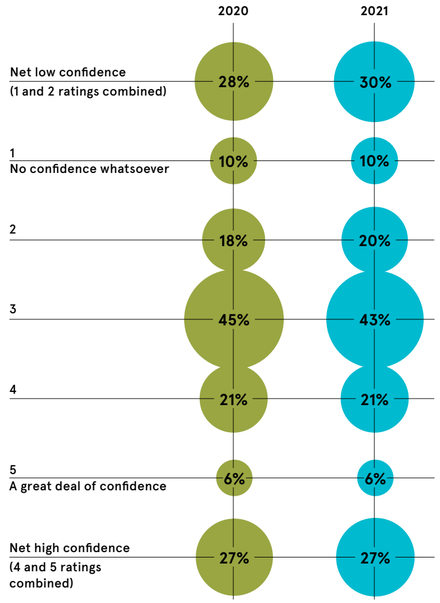
Iceland
This was the first country to develop a patient-facing application programming interface for accessing health records, back in 2017. The Directorate of Health worked with UK firm Digi.me to enable citizens to download digital copies of their medical records.

Finland
My Kanta Pages provides patients with access to their records, regardless of whether they use public or private healthcare services. They can also upload data from smartphone apps and wearables. The system is designed to improve transparency by allowing patients to see who has handled and/or viewed their data.

The Netherlands
MedMij is a national standard for secure data exchange between healthcare users and providers. Citizens can register with accredited apps, websites or other digital tools to retrieve their medical data. This is regarded as a move towards a more patient-centric approach to healthcare.

TRUST IN ORGANISATIONS REMAINS LOW

Percentage of UK citizens who say they have the following levels of confidence in organisations that collect, store and use their personal information



Information Commissioner's Office, 2021

Commercial feature

Bridging the digital divide is about more than internet access

Here's why inclusion, education and technology are essential in the race to close the 'digital divide'

For some, advancements in modern technology have opened up the world. Yet for huge swathes of society, reliable and robust computer and internet access are still not a reality.

From infrastructure issues to digital exclusion, the driving forces widening this gap are plentiful. It's a challenge that's also borderless: in the US millions of Americans still lack basic broadband access, while in the UK some 1.9 million people (22% of the population) do not have the digital skills needed for everyday life.

So how do we edge closer to closing this divide? Ankit Agarwal, managing director at STL, explains.

Q What is the great digital divide and why does it exist in a world where technology plays such a pivotal role in our everyday lives?

A The digital divide refers to the huge gap between those who have access to modern ICT and those who don't.

There are plenty of drivers behind this inequality. One of them is a lack of technological awareness and education. This is a challenge among certain demographics in the UK, where the government is in the midst of implementing a 'digital inclusion strategy' after finding that more than 5 million adults do not use the internet due to a lack of interest, ability or access.

Another factor widening the gap is a lack of infrastructure across geographies. In India, over 25,000 rural villages still lack internet connectivity. Covid-19 has only widened the gap.

Q What is the first step to closing it?

A Better digital infrastructure is the starting point.

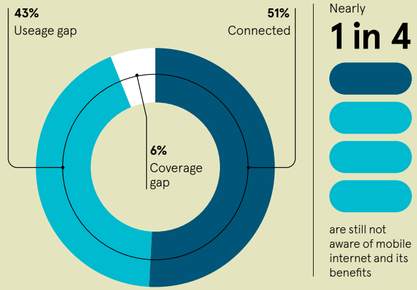
We need to up the ante and invest in developing optical fibre-powered broadband highways across regions. Improving infrastructure could add $13tn to global GDP by 2030, transforming billions of lives in the process.

In the UK, the government is already investing in this area with Project Gigabit. STL, with its purpose of transforming billions of lives through digital networks, is working with players like Openreach to construct an ultra-fast, ultra-dependable 'full fibre' broadband network.

Q Beyond fibre, what else can narrow the chasm?

A Wireless, satellite and 5G technology can complement fibre.

EVOLUTION OF GLOBAL INTERNET CONNECTIVITY, 2014–2020



HOW TO FILL THESE GAPS

- Build better digital infrastructure with fibre, wireless, satellite and 5G
- Make rural Internet affordable by making technology and connectivity work in tandem
- Empower the masses by humanising the technology to bring socio-economic prosperity

Where fibre provides high capacity and bandwidth, wireless technologies offer mobility. Satellites can provide coverage in areas where it is too costly to implement other solutions.

5G-powered tools and technologies can be used to deploy large scale networks extremely fast and maintain them in real-time.

Q In the UK, what other projects are helping to close this gap?

A The rural coverage in the UK is 17% weaker versus urban coverage and the pandemic further widened the gap. Therefore, we see telecom providers and alternate service providers driving large-scale broadband rollouts across the UK.

Over the last decade, STL has been powering optical fibre networks for partners like OpenReach and almost all the top Altnets in the UK to solve this issue.

Q Once people are connected then, how do you empower them to use the digital tools at their disposal?

A While closing the accessibility gap is a priority, it's important to recognise the more prolific usage gap which exists among people living in already-connected areas. About 3.4 billion people are covered by mobile broadband internet but don't use it.

We need to build a digital ecosystem that translates into transformative use cases for all then we need to humanise the technology powering it.

GARV – a supercomputer in the form of a kiosk that is operated by a semi-trained operator – is one solution from STL that enables access to multiple coordinated digital infrastructure and services for rural communities. It has helped close to 100,000 rural citizens in India so far.

Q How do you make rural connectivity viable and affordable?

A Through greater adoption of open technologies and software-driven networking (SDN). SDN provides flexibility and programmability without altering the existing network architecture in any way. The advent of open-source tech in rural areas will make network deployment more cost-effective.

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STL beyond tomorrow

SOCIAL NETWORKS

Antisocial media: UK law toughens up on online abuse

Westminster intends to legislate to protect internet users from a range of harmful content. Is its online safety bill – nearly three years in the making – fit for enactment yet?

Rose Stokes

On the evening of 11 July 2021, tens of millions of people in England were momentarily united in pursuit of a common goal: victory for the national football team in the Uefa Euro 2020 final. In a country whose population has so often been deeply divided in recent years, that night and the days leading up to it felt increasingly hopeful.

The sense of optimistic fellowship turned out to be fleeting in the end. Italy beat England on penalties – and the mood quickly turned. The three English players who missed their penalties, Marcus Rashford, Bukayo Saka and Jadon Sancho, also happened to be Black. They were subjected to such intense racist invective on social media that the prime minister felt obliged to publicly condemn their mistreatment.

This highlighted a problem that Boris Johnson and his cabinet are coming under increasing pressure to address: online abuse and how to protect people from it. The government has made significant commitments to tackling the problem, particularly with the *Online Harms* white paper, published in April 2019, and the draft online safety bill (OSB) that emerged from it in May 2021.

Once enacted, the planned law should empower communications watchdog Ofcom to fine a social media company up to £18m, or 10% of its annual turnover if that is higher, in cases where they fail in their duty of care to users. But not all experts in the field agree that this legislation would be the most effective approach to protecting those most vulnerable to abuse.

Chris Philp is the government's recently appointed minister for tech and the digital economy. He says that "everyone in the UK, especially children, should be free to use the internet without being exposed to content and behaviour that would be unacceptable offline. But there is no accountability on tech platforms, despite their enormous wealth and resources, to protect users. We see this when footballers get bombarded with racist abuse, or when young girls are directed towards a suicide chatroom or pro-anorexia videos, and no one is held to account."

The government, he adds, believes that its planned law will place much-needed responsibilities on social network providers to protect users and safeguard their rights.

Imran Ahmed is CEO of the Center for Countering Digital Hate, an NGO with offices in Washington DC and London. He agrees that "the case for regulation is overwhelming. This bill is one of the most ambitious attempts to hold tech companies accountable for the harms caused by their products. It's a promising step in the right direction."

But Ahmed adds that the law could and should go even further, arguing that the OSB "needs to be strengthened in a number of key areas if it's going to have the desired impact".

One glaring omission in the bill is its failure to address the disproportionate impact that forms of abuse such as hate speech have on female social media users. So says Seyi Akiwowo, the founder and CEO of Glitch, a charity that aims to protect women and marginalised people from online abuse.

> The government must acknowledge the higher level of online abuse that women and girls receive. This is not mentioned in the current version of the online safety bill

"The government must acknowledge the higher level of online abuse that women and girls receive. This is not mentioned in the current version of the OSB," she notes.

Akiwowo points out that women are 27% more likely to be targeted for online abuse than men. For Black women, the figure leaps to 84%.

She believes that much more detail is needed in the bill – for instance, about the distinction between what online content it deems illegal and what it classes as "harmful content". Material that falls into the latter category may still be considered legal. Any failure to provide clarity here would restrict Ofcom's ability to do its job properly, Akiwowo argues.

Her opinion is shared by Twitter. Katy Minshall, the social media giant's head of public policy and philanthropy in the UK, says: "We welcome the increased focus on the safety of those who use online services. We also appreciate the designation of Ofcom as the independent regulator. But we are concerned that, in its present form, the OSB risks setting a harmful precedent. We look forward to seeing more substantive definitions in the bill and will continue to collaborate with the government and industry to build on the work we've done to make the internet a safe environment for all."

Akiwowo has some ideas about what aspects of the planned act should be amended. "It's really important that the part of the OSB that talks about 'legal and harmful content' includes the types of abuse that women face," she says.

These include threats of rape and murder, doxxing (maliciously publishing someone's private personal information) and deadnaming (using the former name of a transgender or non-binary person to belittle their gender identity).

But not all experts in this field are so supportive of the OSB. One of them is Myles Jackman, a solicitor who has campaigned for the reform of UK obscenity laws, which he considers unsuitable for the digital age. He argues that the legislation, if enacted in its current form, could risk curtailing the basic human right of freedom of expression.

A better solution, Jackman says, would be for Westminster to invest in more comprehensive social education, which would guide people away from abusing others, and to direct more public money towards the criminal justice system, which already has laws in place to protect people from abuse.

"If you want a 'safe mode' internet, you need your real-world police to be funded properly," he adds.

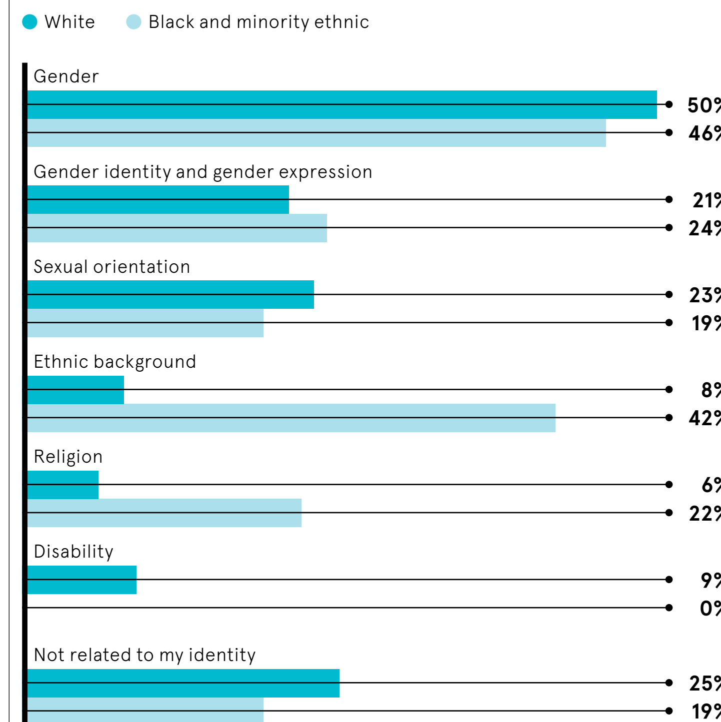
Akiwowo disagrees that freedom of expression and further legislation are mutually exclusive. "It's dangerous when people pit preventing online abuse against preserving freedom of speech," she says. "At the end of the day, online abuse takes away the victims' freedoms."

One matter on which she and Jackman do concur is that reforming existing laws to protect people from harm would be beneficial. For Akiwowo, making misogyny a hate crime would be a good place to start, while Jackman would like the government to tax big tech companies properly and funnel that revenue back into the justice system.

While the OSB's pros and cons continue to be debated, it's clear that the bill represents a momentous shift in thinking about what constitutes harm in the eyes of the law. But it remains to be seen whether the eventual act will be able to capture all the important nuances and so protect those who suffer most from online abuse without causing problems further down the line.

HOW IDENTITY AND ONLINE ABUSE INTERACT

Percentage of British women who say the online abuse they experienced was related to the following aspects of their identity



Glitch, 2020

Commercial feature

How Fujitsu is delivering on the UK's plan to become a scientific superpower

Science and innovation have taken their place at the heart of the UK's vision to become a global power. How can we seize the potential of exciting tech such as AI to solve some of our biggest challenges and prepare the UK for a post-Covid future?

Even before the pandemic, with R&D commitments at 3% of GDP, there was wide recognition that the UK would need to be a different kind of country to compete on a global level.

But when European nations were last inspected by the Confederation of Business Industry (CBI) on new-to-market innovations, the UK ranked 26th out of 28 countries. If the UK is to become a genuine global scientific superpower, it must climb to near the top of this table over the next decade, which means getting much better at commercialising research and operationalising innovation, exploiting the benefits faster than other nations and managing any of the associated risks.

The good news is that the UK is already a world leader in research into cognitive and advanced technologies, such as AI and quantum computing, which will be crucial to leapfrogging other major economies in the years ahead.

"The prime minister now chairs a science council to drive the UK science agenda. That didn't exist before the pandemic and I'm not sure it would have existed in quite the same form without it," says Dr Keith Dear, director of artificial intelligence innovation at Fujitsu, who was advising No. 10 when the pandemic struck. "We've also set up a space council which might not have happened with the same urgency either. And it empowered people like Sir Patrick Vallance, government chief scientific adviser, to have much more influence."

"It's remarkable how strong we are in research but there is a huge gap between our ability as a country to produce ideas and our ability to then turn those into products and services," says Dear. "We've got to close that gap, which first and foremost means now looking at our great capabilities in research and how we can reach the same level of competence in commercialising technologies by 2030. That will require significant co-creation across government and industry."

The UK's trade deal with Japan offers a timely opportunity to trailblaze this kind of co-creation. In the area of supercomputing Fujitsu is making the capabilities of Fugaku (which has just retained its position as the world's fastest supercomputer for the fourth consecutive time) available to government departments. This is set to offer a major boost in government capability across simulation, big data and AI. For example, it can predict coastal flooding from tsunamis in near real-time or applying that to the UK, obtain detailed flooding forecasts and its effects on surrounding infrastructure more accurately and rapidly.

> There is a huge gap between our ability to produce ideas and our ability to then turn those into products and services

Quantum computing is another transformational technology, but it currently requires extreme cryogenic levels of cooling, putting the capability and ownership outside all but a very few organisations. To bridge the gap and make quantum computing more accessible, Fujitsu has developed an alternative called Digital Annealer that can perform the same parallel, real-time optimisation calculations at incredible speed and precision and on a scale that classical computing alone cannot.

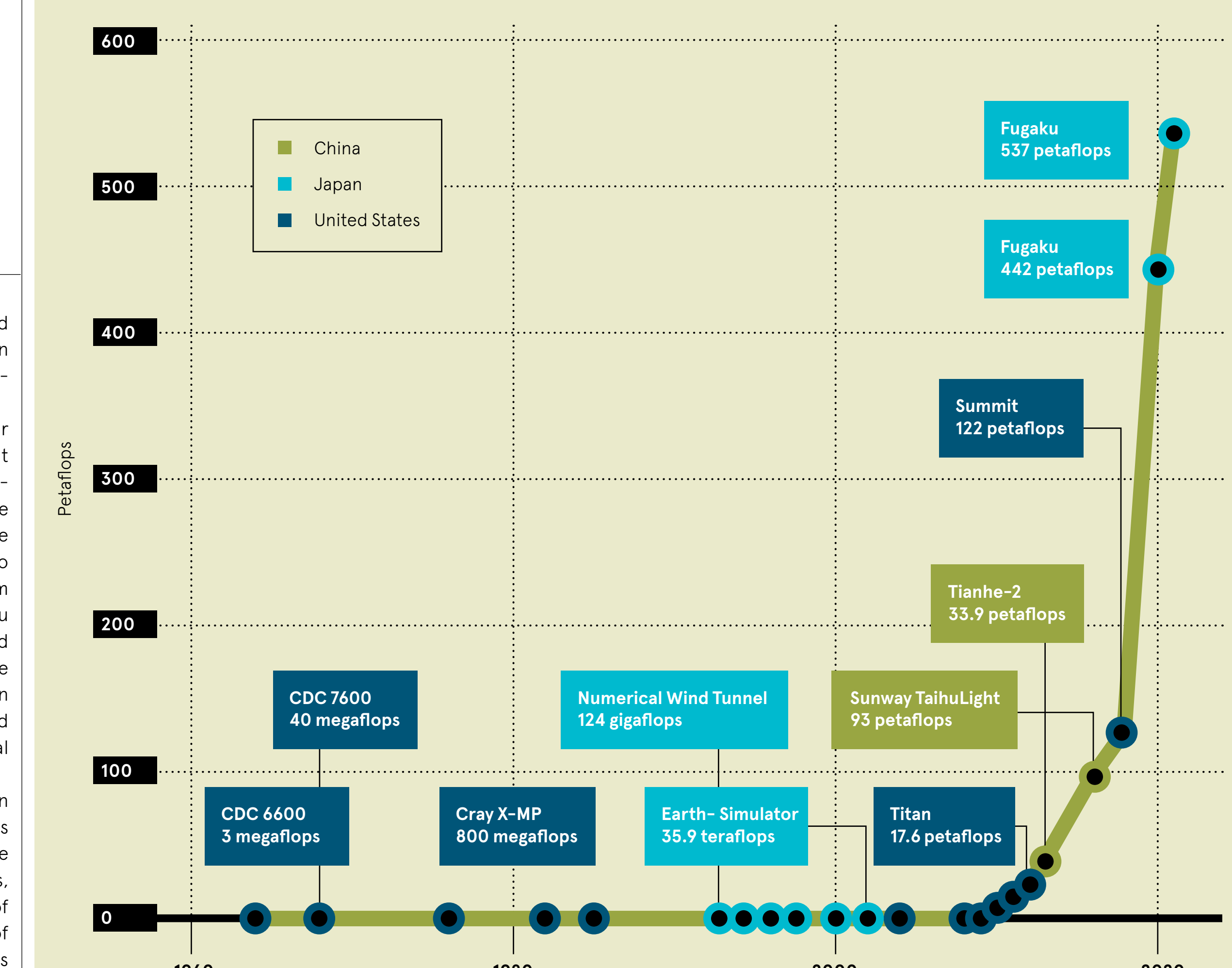
Digital Annealer has already been successfully used where Fujitsu has been working with the UK Space Agency, Amazon Web Services, Astroscale and the University of Glasgow to address the challenge of space debris – 130 million objects travelling in orbit at 17,000 mph which could collide with satellites vital to services we use every day. Using Digital Annealer's quantum-inspired capabilities, the solution prioritises the most hazardous objects causing the greatest risk and plots the optimum route so that, in the future, a single spacecraft will be able to remove them more efficiently.

"While we are developing full quantum computing capability, we have the technology available today through Digital Annealer," says Cathy McCann, head of innovation and portfolio at Fujitsu. "This capability positions us at the heart of the quantum journey, as we co-create solutions to some highly complex and challenging problems both today and into the future."

These cognitive and advanced technologies have huge, wide-ranging potential to make the world a better place, from improving cancer diagnosis to tackling climate change, but it's essential that scientific advancements, driven by the technology, are accessible for everybody and don't exacerbate a digital divide. Building trust in innovation will rely on embedding strong ethics in what is designed, as well as a diverse pool of talent building the algorithms in the first place.

EVOLUTION OF SUPERCOMPUTING POWER

Supercomputers, the date they were released and their computing speed in petaflops (a measure of computing power that shows a processor's capability to calculate 1 trillion floating-point operations per second, as developed by LINPACK. One megaflop is 1 million flops, a gigaflop 1 billion flops and a petaflop 1 quadrillion flops)



top500, archives for pre-1993

> We cannot wait for the advent of full quantum computing to take action. We need to be building our expertise and skills today

Developing world-leading scientific capabilities is the beginning; commercialising them takes them into a completely new domain. New innovations bring enormous new opportunities, but those opportunities will naturally be skewed towards those who have the skills to benefit from the economic impact.

Therefore, for the UK to really benefit, new digital skills will be needed, and we are already facing a digital skills gap. Creating the right platforms to develop these skills across the UK will open up new possibilities for the technology industry and support the government's levelling up agenda.

"We cannot wait for the advent of full quantum computing to take action," says McCann. "We need to be building our expertise and skills today. Digital Annealer enables us to do things ahead of time, principally testing quantum logic and providing application developers, computer scientists, and engineers with the tools to model and test designs before experimental implementation on quantum processors. This will enable the UK to build a bridge from what it can do today to where it wants to be in the future, and to be the scientific superpower it aspires to become."

For more information, visit fujitsu.com/uk, or contact askfujitsu@uk.fujitsu.com

FUJITSU

CLOUD MIGRATION

Nebulous benefits

Westminster's so-called cloud-first directive to public sector organisations has attracted much criticism. Does the policy need to be ditched, or is it simply a matter of executing it better?

Christine Horton

Ever since its introduction in 2013, the UK government's so-called cloud-first policy has been at the heart of the public sector's digital transformation efforts. Put simply, the policy means that organisations seeking to update their technology need to evaluate cloud-based systems before considering any other option. But there is a strong argument that applying this approach across the board, regardless of context, is unwise.

Hewlett Packard Enterprise (HPE), a technology vendor that promotes a hybrid approach to IT adoption, mounted a publicity campaign in September that described the government's cloud-first directive as "inappropriate" for the public sector. HPE argued that the friction between the policy and the realities of following it had "left cloud strategies disjointed and incomplete – or, at worst, completely stalled" in some organisations.

This is because a public cloud is not always the most efficient and/or appropriate data repository. More than three-quarters (78%) of public bodies provide services that are unsuitable for migration to a public cloud, according to government figures requested by HPE under the Freedom of Information Act 2000. Moreover, 63% of public sector organisations have yet to adopt a dedicated cloud strategy. More than 70% of their infrastructure and 73% of their data remains on the premises.

The cloud-first policy "mandated where workloads and data should be without prescribing how to do this," says HPE's vice-president of UK sales, Matt Harris. "In many cases, it failed to anticipate the long tail of legacy IT, entrenched outsourcing and a lack of skills throughout the sector. It set a destination without addressing the steep mountain to climb on the way there."

So does the public sector need to drop the policy, or is this merely a question of following it in a more effective way? And is it only a technological issue, or are deeper cultural factors also at play?

> **Cloud-first set a destination without addressing the steep mountain to climb on the way there**

Sean Gladwell/via Gettyimages

Tracey Jessup is chief digital and information officer at the Parliamentary Digital Service, which helps MPs and staff working at the Palace of Westminster with their technological requirements. She reports that the cloud has enabled her organisation to deliver new services cost-effectively.

"Public sector organisations need to be focused on their core purpose, not on running technology. The adoption of cloud services gives them an opportunity to shift the burden of running complex systems to specialist suppliers," Jessup says. "The public sector can also face significant challenges in recruiting technical specialists. Cloud systems provide a way to access those technologies without needing those specialists."

But adopting cloud services isn't something that can be achieved overnight, of course. "Applications need to be redesigned and prior investments in legacy tech need to be realised before the financial case stacks up. Every organisation will be at a different stage in its journey to the cloud," she says.

The critics' argument is that a one-size-fits-all approach is not appropriate. Some public sector organisations may find cloud systems too difficult to implement and/or lack the required skills or procurement processes. In other cases, owing to the characteristics of the legacy systems they have, they simply won't be able to deliver on the cloud-first policy.

Nonetheless, progress towards cloud computing has accelerated during the pandemic, according to research conducted late last year for the Cloud Industry Forum. In the public sector, 49% of organisations had increased their cloud adoption as a direct result of the Covid crisis. Among those that had already migrated, 97% of decision-makers said that the cloud had been central to their response to the pandemic, with 42% describing its role as critical.

The Cloud Industry Forum's CEO, Alex Hilton says: "Looking at cloud benefits, 65% of respondents in the public sector cited the quick transition from office to remote working it had enabled. In addition, 55% mentioned how it had helped the organisation to become agile, while the same percentage said it had enabled their operations to continue as usual throughout the upheaval. It's clear that short-term advantages were delivered early in the pandemic, which will translate into greater organisational resilience in the long term."

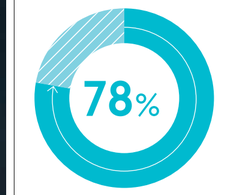
49%

of public sector organisations have increased their cloud adoption as a result of the Covid crisis

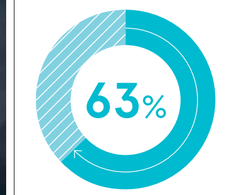
42%

of public sector decision-makers said the cloud had played a vital role in their response to the pandemic

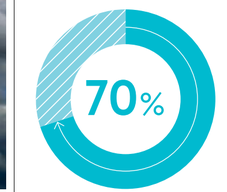
Cloud Industry Forum, 2021



of public bodies say that they have services that are unsuitable for public cloud migration



of public sector organisations still do not have a dedicated cloud strategy



of organisations' infrastructure

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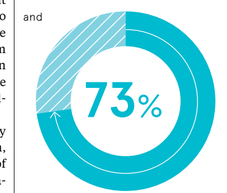


of their data remains on the premises

Hewlett Packard Enterprise, 2021

> **Public sector organisations need to be focused on their core purpose, not on running technology**

According to recent research by the International Data Corporation, despite the widespread adoption of public clouds, 70% of all applications remain outside them. This is down to several factors, including data gravity (the ability of a large body of data to attract services and applications); concerns about maintaining effective cybersecurity and regulatory compliance; and unpredictable costs.

What might be a preferable alternative to cloud-first, particularly considering the acceleration of digital transformation in the public sector? Noting that the business world is shifting from a cloud-first model to a "cloud-everywhere" one, Harris argues that the public sector should follow its lead. It means accepting that not everything is suitable for public clouds and that many benefits of a cloud operating model can be realised in private data centres. This approach can "improve efficiency, reduce energy consumption and optimise costs, as you pay only for what you use".

He continues: "The next decade will be focused on using data everywhere across the entire organisation. The public sector should look to adopt edge-to-cloud platforms that enable them to connect, protect and analyse all their data and act on that information. This is a strategic imperative for every organisation, so that it can unlock the full potential of its data."

Public bodies that are excelling in their use of the cloud

Despite the challenges of complying with Westminster's cloud-first policy, there have been numerous cases in which moving to the cloud has proved successful. Here are some examples

The Welsh government
The devolved government of Wales decided to shift its technology, services and data to the cloud in a move more aligned with the UK government's policy. One of the main benefits of the transition was to equip the organisation with devices, software, connectivity and collaboration tools so that jobs were no longer tied to a particular building.

By changing HR rules on flexible working and moving away from fixed desks, the Welsh government was able to introduce a smart working policy with a greater focus on employee wellbeing and productivity.

The Department for Work and Pensions
The UK's largest government department has adopted a cloud-first programme to enable it to reduce its reliance on "expensive and hard-to-maintain on-premise hardware" and to scale up its operations more quickly.

This has featured a new approach to device management in a project to roll out new computer hardware for members of staff. Individual configurations were created for user profiles and distributed from Microsoft's Azure cloud platform using Windows Autopilot. This, the department says, has removed complexity and eliminated time-consuming system re-installations.

The Meteorological Office
The Met Office has announced a multimillion-pound agreement for the provision of a supercomputing capability on Azure that, it says, will take weather and climate forecasting to the next level.

The data it generates will be used to provide more accurate warnings of severe weather events, helping to build resilience and protect people, infrastructure and enterprises from their effects. The precision and accuracy of its modelling will help to inform government policy as part of the UK's fight against climate change and its efforts to reach net-zero greenhouse gas emissions by 2050.

The Office for National Statistics
Last year, the Office for National Statistics decided to adopt a cloud-first approach to help its core functions operate more efficiently. This included ways to better collect, process and interpret data to produce higher-quality information; improve data-sharing with policy-makers and other stakeholders; store data more securely; and efficiently complete the online census in 2021.

The Office for National Statistics has since adopted a target of having 80% of its infrastructure in the cloud by 2023.

Jonathan Knowles via GettyImages

DIGITISATION

Identity politics

The UK government is planning a comprehensive national digital ID scheme. Judging by the experiences of countries further down this route, it will need to tread very carefully

Andy Jones

In November 2020, the government of India proudly announced that 1.2 billion citizens had been profiled by the national digital identification programme. While this was an impressive return for the Aadhaar system – described by the World Bank's former chief economist, Paul Romer, as "the most sophisticated ID programme in the world" – the scheme had still left behind millions of people, many of whom were the most vulnerable members of society.

Activated in 2010, Aadhaar combines a 12-digit ID number with iris scans and fingerprint data. But, given that leprosy remains a problem in rural parts of the country, many people cannot supply fingerprints. For instance, Harshabati Kheti, a 68-year-old woman living in the eastern state of Odisha, was unable to authenticate herself for ration distribution because she had no fingers, meaning that she was denied food and other key welfare services for nearly a year, despite having a disability certificate.

Marginalized Aadhaar, a report written by Subhashish Panigrahi, a human-rights activist and documentary filmmaker, revealed that the system was also of limited use to the 800,000 Soras Indians living in Gajapati, an isolated district of Odisha, who speak only a regional dialect and rely on a local herald to deliver them the news each day.

In the northern state of Uttar Pradesh, Aadhaar declared nearly 6% of the population – approximately 1.9 million people, mostly Muslims – illegal overnight. It was also where 200,000 tonnes of state-supplied foodstuffs were pilfered using fraudulent ID numbers, diverting vital rations away from the needy.

While India should still be lauded for bounding so far ahead with its digital ID programme, other nations can be forgiven for proceeding with relative caution as they seek to avoid the types of problems that were encountered during Aadhaar's roll-out.

Dr Ana Beduschi, an associate professor of law at the University of Exeter, is leading research into the legalities of Covid passport programmes (see panel, opposite page). She notes that digital ID technologies are not inherently neutral and can exacerbate existing inequalities, working against the very people whose rights they have been designed to protect.

"Research has demonstrated that, although most citizens have found India's programme easy to use, a sizeable minority have encountered problems with biometric authentication," she says.

The UK government published plans for a comprehensive digital identification programme in 2020 and has since sought bids for a £4.8m contract to produce an app. This follows advanced ID schemes in Estonia and other embryonic programmes in Australia, Canada and New Zealand.

In theory, a secure digital ID system would enable British citizens to simplify interactions between themselves, businesses and public authorities. So says Christopher Ansara, founder and CEO of Alt/Ave, a specialist in secure digital document distribution.

"Having a digital ID is key for modernising public health services through remote online authentication," he says. "It will also be incredibly useful within financial services, collecting confidential data and improving administrative efficiency by reducing paperwork and human error."

But one of the criticisms levelled at Australia's planned digital ID programme is that the government wants the scheme to link no fewer than 80 diverse services.

Bruce Esposito is a strategist in identity and access management at US software firm One Identity. He believes that creating a monolithic system that unwittingly over-identifies the public should be avoided. This is what happened in the US with the marriage of social security numbers and the credit system, a situation in which too much information became far too easy to obtain. Pages of data were transferred – regardless of need – in each transaction.

The UK should therefore apply what's known as contextual integrity in its digital ID scheme, storing as little data as possible and transferring only what's needed for each party, he argues. "A healthcare provider may need to know a person's sex and weight, for example, but a retail provider would not. Conversely, a retailer may need to know a person's income, as reported on tax forms, in order to extend credit, but the healthcare provider may not need to know this."

Smartphones are already enabling this level of functionality, becoming a de facto digital ID for their owners, Esposito adds, although concerns remain about how much personal data they allow to be shared with third parties without users' knowledge, let alone consent.

Given that Westminster spent £37bn on the roundly criticised NHS Test and Trace system, does the UK have the wherewithal to create an effective and trustworthy ID system? Over the past year, the government has faced data-breach scandals ranging from the prime minister's leaked text conversations with Sir James Dyson to the Ministry of Defence's failure to protect the identities of 250 local interpreters who'd helped the British Army in Afghanistan.

Many large enterprises simply aren't careful enough in safeguarding the data in their possession, argues Trevor Morgan, product and marketing manager at Comforte, a specialist in cybersecurity.

"Most of these organisations aren't necessarily experts in data security practice," he says. "The most obvious way for them to engender mistrust is to get involved in a data breach that could have been prevented with a little knowledge and effort."

Even companies with expertise in secure data handling can fall foul of the rules. In 2017, for instance, the UK Information Commissioner's Office deemed a partnership between Google's DeepMind division and the NHS illegal for its "overly broad sharing of data".

The best way to protect sensitive information against sophisticated cybercriminals isn't to squirrel it away behind guarded perimeters but to impart protections into the data itself, according to Morgan.

"Data-centric techniques such as encryption are well known, but these can come with a lot of operational overheads," he says. "Protection methods such as tokenisation are much better. This will replace sensitive elements with innocuous representational tokens while preserving the original data format, which makes it much easier and cheaper for business applications to use."

To address privacy concerns, the UK needs to empower citizens with a "self-sovereign identity" that enables them to retain control of how their data is used, according to Esposito.

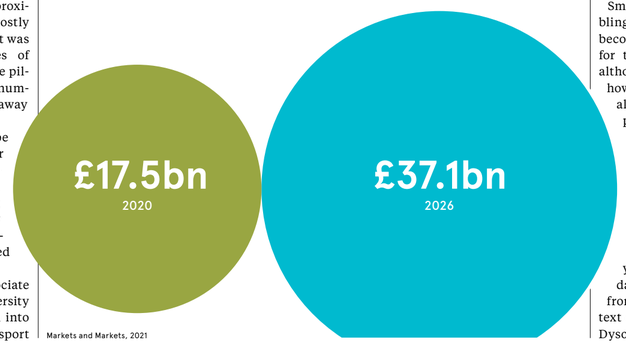
"A person should be able to own and control every aspect of their identity – which information is shared, where it is held and, most crucially, when it is forgotten," he argues. "Individuals shouldn't be asked to cede control over their identity to any one organisation."

The government's skill in positioning itself as the conscientious guardian, rather than the secretive user, of people's data will ultimately decide the UK's digital ID future.

> **The most obvious way to engender mistrust is to get involved in a data breach that could have been prevented with a little knowledge and effort**

HOW MUCH WILL THE DIGITAL IDENTITY SECTOR BE WORTH?

Expected revenue growth in the global market for digital ID solutions



Markets and Markets, 2021

Blake Callaham via GettyImages

How close is the UK to vaccination passports?

Where we are now

As the world edges towards the adoption of Covid passports, the UK is divided on the need for them. In November, Wales joined Scotland in requiring people to provide proof of vaccination to be granted entry to venues including restaurants and theatres.

While England has resisted such measures, Westminster has indicated that people would need a third jab to be deemed "fully vaccinated".

What might happen next

Passports could still be introduced under the government's so-called plan B this winter if there is a sharp increase in the rate of infection. Residents across the UK can already prove their status using the NHS App, which generates a Covid pass that shows the user's vaccination details and/or test results.

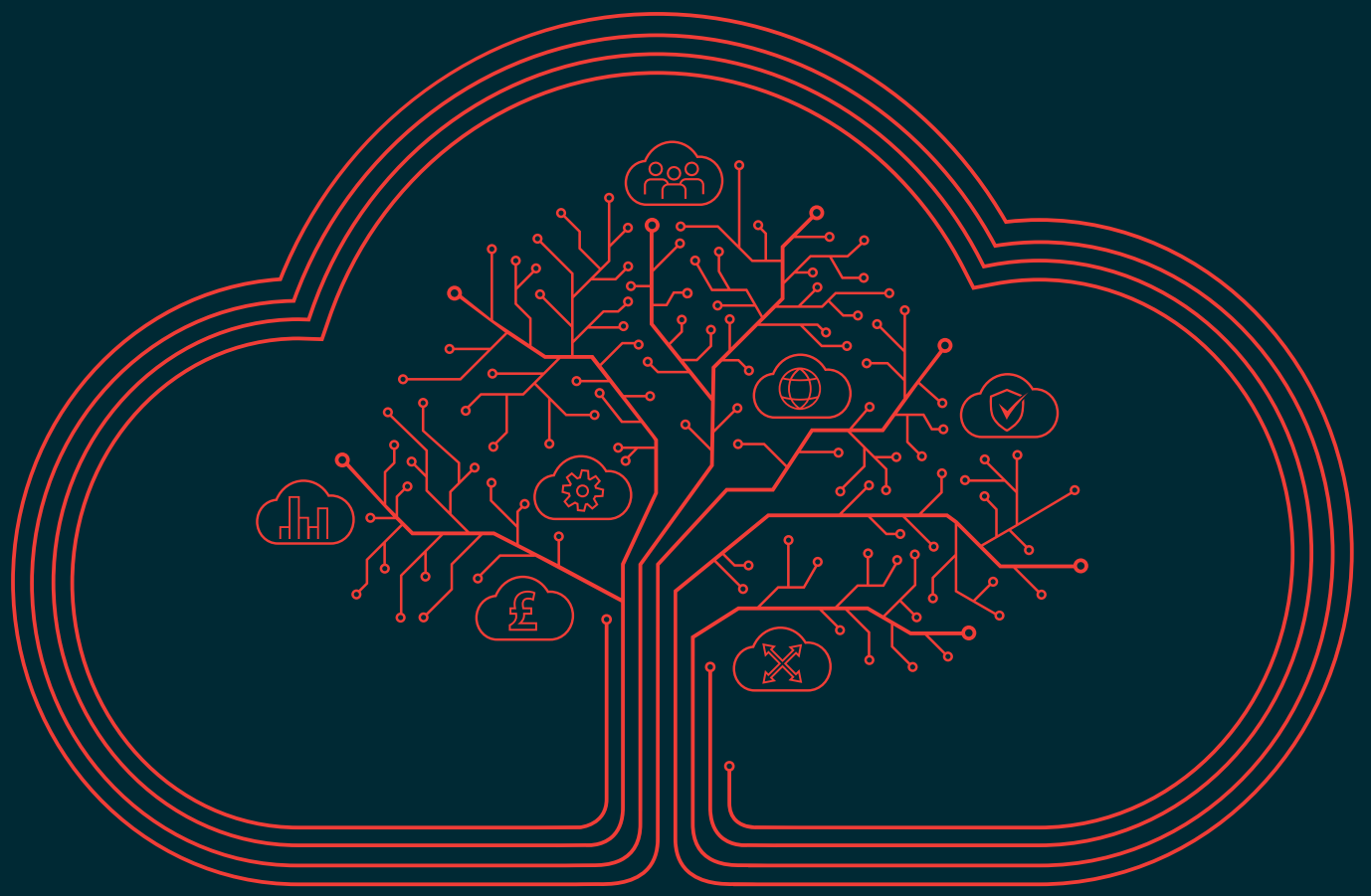
Factors militating against the adoption of passports

Public mistrust in how the state uses its tech could be a barrier. Last year, North Dakota's contact-tracing app, Care-19, was found to be covertly sending users' data to third parties, for instance, while the government of Suzhou, China, used CCTV and facial-recognition software to shame people engaging in the "uncivilised behaviour" of going out in their pyjamas.

"This example is benign when considering the more obvious reasons why an authoritative government would have an interest in implementing a unified identity to track its citizens," says Bruce Esposito.

Westminster will need to demonstrate to the public that data privacy considerations are no mere afterthought, according to Ana Beduschi.

"Policy-makers should also ensure that accountability and the adjudication of grievances are available and effective, reinforcing governance mechanisms within digital identity frameworks," she says.



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