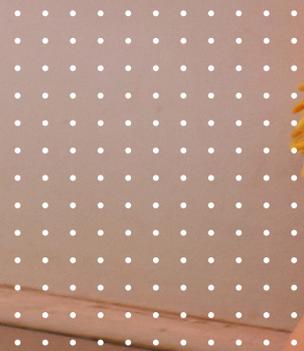


Respond, Adapt, Recover

Stories of how tech is
delivering on the frontline



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Introduction

Julian David, CEO, techUK

Respond, Adapt, Recover

Respond. Adapt. Recover: the three words that you will see running through the entirety of this report. We are asking how the UK responded in the immediate wake of the COVID-19 pandemic's first peak and lockdown, how businesses and people adapted to a new normal, and with vaccine roll-out underway, what steps must be taken for our economy and society to recover – demonstrating the role of technology in achieving this.

What we aim to highlight here is some of the organisations that have taken on the challenges presented to the UK during of the pandemic, the role of technology in finding solutions, and the lessons learnt so far that will provide a framework for what comes next.

You will hear from a number of innovative companies doing tremendous work: in scaling up our healthcare response, in offering solutions to our new ways of working, in bringing communities together in a time of isolation, and using data to help us react to and overcome this pandemic.

The techUK response

Our first priority was simple. Like every business we had to look after our own staff and members.

With the cloud, we were able to move all of our

operations online within days – enabling our staff to continue to work, while making sure we could still deliver value to our members and stakeholders.

Since, we have seen up to 40% higher participation from members and stakeholders at our events – of which we have run over 500 fully online since March, attended by more than 14,000 people.

While we had the capabilities for digitisation, many did not. Lockdown saw a digital migration on an unprecedented scale – with massive disruption to each aspect of our daily lives, as well as the huge health consequences of the virus itself.

And so, our first questions were around how we could help public services move online. We supported our members in rapidly responding to the challenges the public sector was facing, working closely with the NHS, Public Health England, schools and directly with ministers to deploy solutions.

We had a great response to our call out for offers of support to local government and techUK curated all offers in a central repository. Members from Agilisys to Civica to PDMS and many more responded with how their technologies could enable local authorities to manage incoming requests, directing these to appropriate services or third sector teams.

These were based on criteria such as location, type of help needed and level of vulnerability.

Others such as Microsoft deployed Teams throughout the NHS, while both it and another member, Zoom's usage grew significantly to help keep people connected. Equally, apps such as Google Classroom were picked up by schools to assist with online teaching.

Identifying the challenges

Beyond the immediate response we had to look at the stability of the UK's digital infrastructure. There were some real question marks about how this would cope with a near universal move online, particularly the huge increase in online video, entertainment and retail. How would our members get engineers out to those who needed them? How would we get equipment? How do we ensure data centres keep running?

With national government, we set up daily interactions, meetings, and to do's, to help overcome these challenges. It was an unprecedented time of collaboration, which we want to catch, bottle and build on, because that's the way our country should work moving forward – a digital economy, supported by the public and private sector, taking on these challenges and delivering for the whole of the UK.

With the right infrastructure in place, the next question was around how businesses and their employees could adapt to their new ways of working and how you move through this to reinvent the economy for the new normal.

While financial and professional services as well as some educational services and tech companies themselves had the digital capabilities to adapt, lockdown revealed with clarity the parts of our economy that have not yet gone digital.

Travel, tourism and hospitality – naturally predominantly physical industries – have been the hardest hit and require the most support moving forward. But even so you have seen restaurants particularly adapting and adopting technology, with increased home deliveries, online access to their recipes, and promoting of their supply chains directly to customers.

For every company, in every industry, in every region, the challenge was unique and so, we decided to go out and find out about this for ourselves on the ground.

What's next?

Over the past few months we have held a series of national Digital Dialogues in all four nations of the UK and regions of England. The idea was to get businesses, communities, local authorities and other interested parties from investors to academics all together, to discuss at a regional level what the challenges, opportunities and requirements are for each.

We are producing reports from these that highlight where we, the tech industry, can play a part, and where techUK in particular can act as a convener for our members who want to help.

As we move forward, we can clearly see a massive change in the landscape – to a digital economy like we have not seen before.

techUK remains dedicated to the ongoing response, to helping organisations adapt and to providing tools for this recovery, and I hope this report highlights just how many organisations are joining us in working hard to build the future we need.



Chapter 1

Scaling healthtech in the NHS and social care

New and innovative technologies in the health and social care sector have been implemented increasingly widely over the past decade. But processes years in the making had to be accelerated into widespread adoption overnight as a result of COVID-19, in terms of both the management and delivery of healthcare.

This sudden acceleration has been one of the greatest challenges of the pandemic, but one that primary and secondary care – not to mention patients themselves – adapted to quickly. This chapter explores how this was done, who led in developing innovative solutions, how they were implemented and what this means for the future of health and social care in the UK.

Respond

“In some parts of the NHS you’ve seen 10 years of digital transformation done in a matter of months,” says Dr Jonathan Bloor, Medical Director at System C. The rapid acceleration of technology use in the NHS and social care system has been perhaps one of the most successful aspects of the UK’s COVID-19 response. According to Dr Bloor, this has been a long time coming.

“If you look at primary care, which was very focused around face-to-face contact, it has been transformed overnight using technology that has existed for a long time, but had not been widely adopted before the pandemic.”

While the outcomes have been positive, overnight adoption did not come without its challenges, most notably the more than two million people classed as ‘extremely vulnerable’ who were required to shield for the first 12 weeks of the pandemic.

Dr Shaun O’Hanlon, Chief Medical Officer at EMIS Group, says: “Understanding both who needed to shield and how they would access care while doing so was a massive challenge, as the sources of data were very complex. It involved analysing both NHS primary and secondary care data – the latter of which is not designed for this at all.”

Achieving this is something that took time and significant collaboration between care providers, suppliers and NHS Digital, the national provider of information, data and IT systems, to get right: “It was an incredible success to get this up and

running within a month, when most NHS programmes take two-to-three years. It was simply a necessity to do it and showed that when tech acceleration had to be done, the NHS could do it,” Dr O’Hanlon added.

But while the urgent response to the virus’ physical effects got one part of the NHS moving quickly – from tech adoption to the building of the new Nightingale hospitals – the same speed of response was not always afforded to mental health and social care services, according to Tunstall Healthcare Managing Director Gavin Bashar: “It’s easy to say in hindsight but perhaps we should have had a clearer lens on the obvious impact months of isolation would have on many – the mental health implications, and additional downstream impact on the NHS from the problems that accompanied it.”

Despite the indirect effects of the pandemic being tackled less urgently on a national level than the direct health implications of the virus, organisations like Tunstall stepped up quickly, re-purposing their existing technology solutions to deal with the impact of the outbreak on vulnerable people.



Two main applications proved to be most effective. Remote patient monitoring meant people with long-term health conditions could take their own vital signs measurements and record their symptoms at home, enabling clinicians to view these remotely, without the need for home visits or hospital appointments. Any breaches of parameters raised a red flag on the system, and results could also be viewed over time to identify any deterioration at an early stage, enabling prompt intervention. This solution can be rapidly deployed, and is equally applicable to people with long-term conditions at home, monitoring the health of care home residents or supporting children with eating disorders.

For people with long-term care needs living at home, particularly those living alone, community alarm systems enabled them to access help in an emergency, or automatically receive help in the

event of a fall, for example: “Community alarms have supported millions of people in the UK for many years, but have become increasingly important during the pandemic. Sensors in the home raise an alert at specialist monitoring centres who can then send an appropriate response,” Gavin explains.

“In addition, centres can also make proactive calls to check on the wellbeing of service users, and signpost to other services if needed. For those who don’t already have a community alarm system, we’ve introduced an app to enable them to contact the monitoring centre and receive proactive calls according to their level of need using a smartphone.”

Adapt

The way that both staff and patients have adapted to the sudden digitisation of the primary care sector is something that Dr Shaun O’Hanlon describes as “phenomenal”. He credits years of hard work in building the infrastructure to make it possible: “Primary care went from 80-85% of contacts done face-to-face, to less than 5% being done in GP surgeries.

“Within 10 days of lockdown you had GPs and nurses all working from home, doing pretty much the same job to the same ability, just without physical contact.”

The biggest changes that had to be made to enable this were around access and data security. The NHS network is not available online, and so VPN infrastructure had to be enabled in physicians’ homes to allow them secure access to their clinical systems and resources: “We built a gateway for GPs where they could use soft tokens to get into their systems, manage their patients and work from home,” Dr O’Hanlon says.

What made adaptation possible was the necessity of it. The technology existed, but Dr Jonathan Bloor believes it was organisational issues that held back its widespread use: “There were organisational and political changes that made this rapid digitisation possible. Firstly, at a board level, executives of all disciplines were driving the need to use technology, which had not been the case historically.

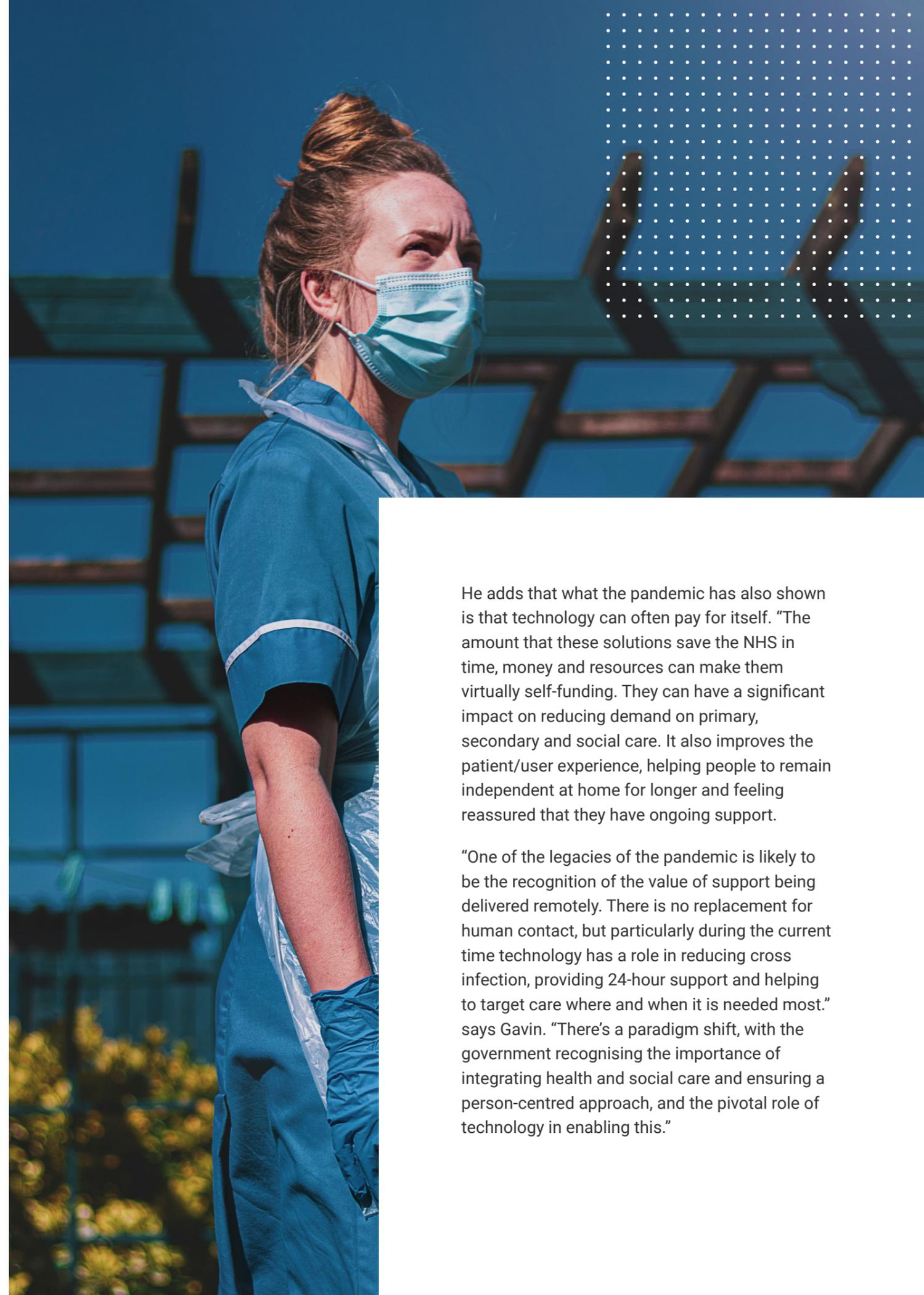
“There was a ‘major incident’ response to the pandemic that meant quick and decisive structural changes were made to enable data sharing and remove perverse incentives/disincentives. It was not about adopting technology for technology’s sake: it became a matter of safety, with the risk to patients and staff of not virtualising primary care far higher than the risk of deploying the technology. It also enabled new and more efficient clinical workflows.

“Finally, money became available that wasn’t too prescriptive, which meant each organisation could decide how best to resource this.”

Gavin Bashar agrees that necessity has been the mother of invention: “In UK healthcare, it has always taken time to get new technologies adopted as everything has to be extremely evidence-based – it has to prove its benefits and worth to the system. With COVID-19, the urgency meant that things were introduced in weeks rather than months of year, which has been a really good thing.”

He adds that what the pandemic has also shown is that technology can often pay for itself. “The amount that these solutions save the NHS in time, money and resources can make them virtually self-funding. They can have a significant impact on reducing demand on primary, secondary and social care. It also improves the patient/user experience, helping people to remain independent at home for longer and feeling reassured that they have ongoing support.

“One of the legacies of the pandemic is likely to be the recognition of the value of support being delivered remotely. There is no replacement for human contact, but particularly during the current time technology has a role in reducing cross infection, providing 24-hour support and helping to target care where and when it is needed most.” says Gavin. “There’s a paradigm shift, with the government recognising the importance of integrating health and social care and ensuring a person-centred approach, and the pivotal role of technology in enabling this.”



Recover

There are challenges that mean sustaining digitisation in the long-term will not be simple: “This is going to require tools becoming more sophisticated and patient friendly, as this has happened more out of necessity than out of choice,” Dr Shaun O’Hanlon explains.

“It will also require long-term professional engagement, with a long-term failure in primary care being an inability to properly stratify demand. We need to use technology now to efficiently manage priorities and encourage patients to see a pharmacist or to self-manage online when it is not necessary for them to see a doctor.”

Dr Ian Chuang, Chief Medical Officer at Elsevier – an information and analytics company specialising in scientific and medical content – wrote that he too sees the success of new technologies as being significantly reliant on both user-friendliness and efficiency, arguing it has to improve the human-centred experience, rather than adding new complexity and costs.

He added that maintaining digital workflows will ensure consistency of care and support patient management, which will increase preparedness for future healthcare crises.

Dr Chuang also believes it is the responsibility of organisations with advanced healthcare technologies to provide support to countries beyond the UK, in order to mitigate the global spread and impact of the virus.

Elsevier, for example, has translated and granted access to Portuguese-language content to frontline staff in Brazil, including drug monographs and patient care plans.

Perhaps the biggest work in recovery has been in getting the entire healthcare sector back up to speed following where routine appointments for long-term conditions, including cancer and diabetes, were put on hold.

“There was an inevitable impact on patients with chronic conditions and so as we normalise these services again, there has to be a stratification process of the highest-risk patients so that we can close the gap and provide them with better care than before,” explains Dr O’Hanlon. “Simply re-hydrating these services to the level they were before will mean those most vulnerable are missed and unable to receive the treatment they need.”

Conn O’Neill, Public Affairs Lead for the UK and Ireland at Roche Diabetes Care, described what is needed for diabetes patients moving forward. Firstly, a need to move healthcare outside of hospitals towards remote consultations, relieve pressure on the system and reduce the risk of virus transmission.

The use of proven health apps and solutions integrated with existing care pathways will be key in enhancing remote consultations. This will help patients with their self-management and free up staff resources. With updated clinical guidelines on how doctors can use patients’ data from apps, clinicians will also be able to provide better services, with data-based evidence on how patients are managing their diabetes, and deliver the appropriate amount of support and care.

But in spite of the challenges, with the rapid acceleration of digital solutions, Dr O’Hanlon asks whether the pandemic has in fact been healthcare’s ‘online banking moment’. With technology now available and widespread – like in financial services, it appears it is here to stay.

Dr Jonathan Bloor agrees: “It’s going to be hard to go back. Before the pandemic the NHS was spending £100 million each year on postage, when most people prefer electronic communication. It was the biggest purchaser of pagers on the planet and caused 5% of UK road traffic. We don’t want to go back to that.”



Chapter 2

The digital transformation of communities

Communities, and the businesses and people in them, are living in a changed world. One where the digitisation of public services and remote working have accelerated, while physical services are becoming increasingly outmoded.

But the story of what has happened throughout this pandemic, is one of mobilisation and support: one that has seen local authorities, small businesses and community groups adapt to the challenges of increased physical isolation, ensuring that people have remained connected by finding new and innovative tech-driven solutions to support one another.



Respond

A quick and efficient response to the immediate challenges of lockdown was crucial to keeping communities connected in the early days of local pandemic response.

The key to achieving this was collaboration and focus, says Paul Brewer, Director for Digital, Sustainability & Resources at Adur & Worthing Councils: “We learnt how intensively you can work and how focused and quick you can be to respond if everybody pulls together.”

An existing low code platform – a software development approach that requires little to no coding in order to build applications and processes – made for a smooth transition for Adur & Worthing, with tech-enabled software readily available from the outset: “We benefited from there being another team of developers that we collaborated with at Croydon Council, but the key was already being geared up to design new platforms using low code,” explains Paul.

This meant that within days, its team had not only created a vital lifeline for local businesses with a business grants application tool, but a response platform to support the vulnerable in their community: the elderly, the food insecure and those living alone who may have had to shield.

The platform offered a ‘request for community support’ service that could be filled out by anyone on behalf of someone in need, and a volunteering service for those who wanted to help. Using simple questions on the registration platforms, a team of neighbourhood ‘connectors’ quickly identified those who needed support and local volunteers nearby who could help.

The online platform itself is easy to access for volunteers, so they could quickly find out the names and addresses of those they had been allocated to support and the type of support each person needed. The response was overwhelmingly positive – with 93% of volunteers saying they thought the online platform was good or excellent.

“We had the sort of satisfaction rate that you’d be delighted with if you spent 18-months building it, let alone a matter of days,” says Paul.

Initiatives like these have not been consigned to just a few local authorities. Aurelie Lionet, service design consultant at Globant, says that technology has proven itself to be a facilitator of community mobilisation and support all across the country. More than 4,300 hyper-local mutual aid groups have been overwhelmed with volunteers – with an online map created specifically to help vulnerable citizens find their closest one.

On a more informal level, social media and instant messaging became more important than ever during lockdown with peer-to-peer support groups created within neighbourhoods using WhatsApp, Facebook, Slack, Zoom and more.

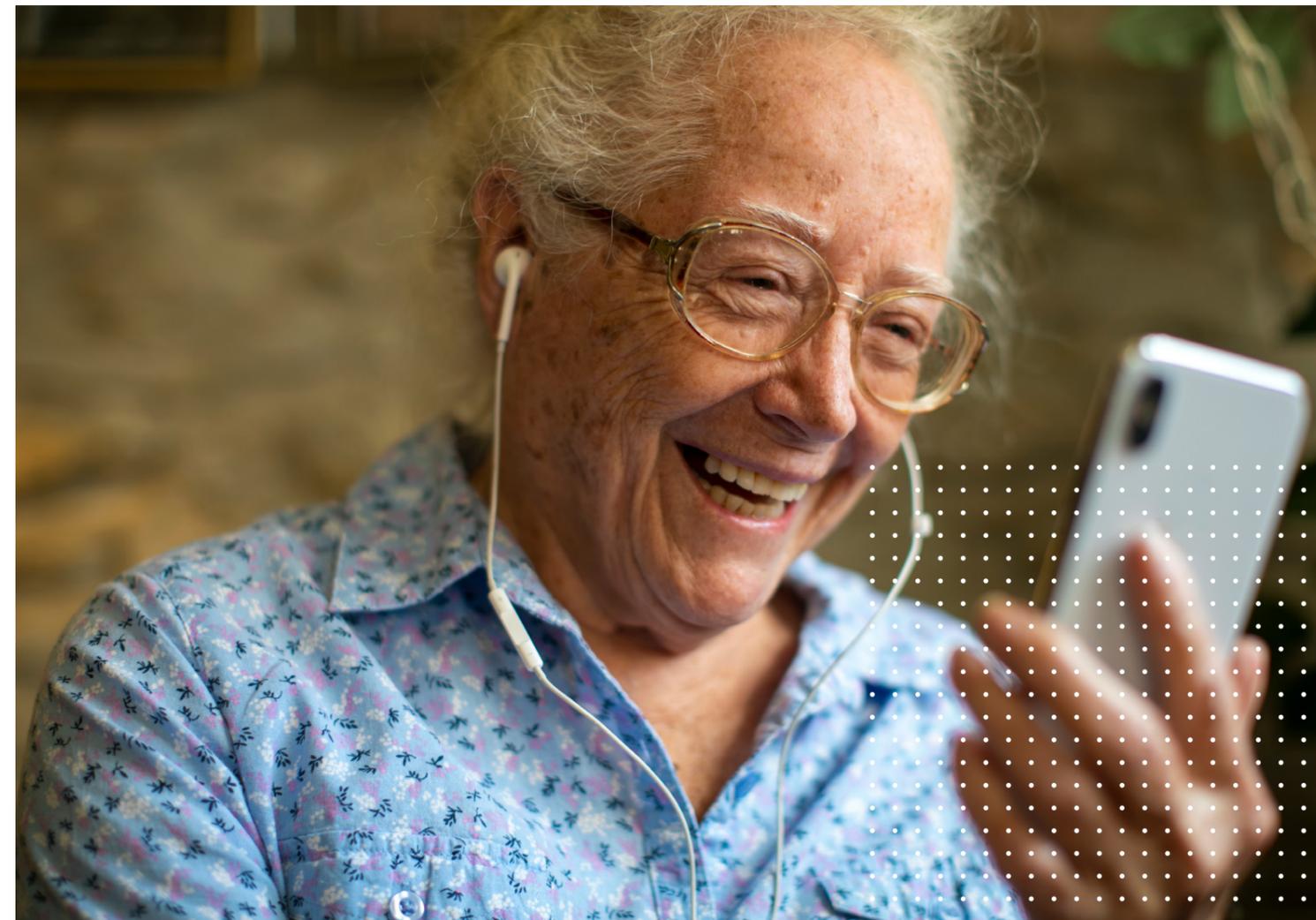
Pamela Cook, managing director at Infoshare, wrote how nationally, the GoodSAM app was used by the NHS to recruit hundreds of thousands of volunteer responders across the country, putting vulnerable people in touch with those who can help and enabling volunteering at scale.

And the government’s TechForce19 challenge – a partnership between NHSX, the Department of Health, and the Ministry for Housing, Communities and Local Government – awarded individual grants of £25,000 to 18 innovative digital solutions.

Those chosen were diverse; ranging from Neurolove’s online group and individual therapy sessions to support young people suffering with mental health concerns, to Freebris’ platform to help carers remotely identify health risks in elderly communities.

“Having the confidence and agility to take matters into your own hands has been essential – from choosing the right technologies, to being adaptable in how these are used,” Paul Brewer explains.

“Each borough understands its own community’s needs and the different levels of tech capacity within them. This flexibility and ‘grab the bull by the horns’ approach we have seen across the country provides a blueprint for how we adapt and move forward in community services.”



Adapt

If response was about making immediate support for the vulnerable accessible, adapting is about ensuring that in the long-term, these new systems continue to work for everyone if they are to remain in place.

Despite the quick response of local authorities and community groups to provide support for those in need, a number of factors meant that many people were ill-prepared for a sudden shift towards digital platforms, as explained by Sean Massey, managing director at Civica.

Research found that at least prior to lockdown, four million people in the UK were digitally excluded. Rural communities did not have the bandwidth available to them to work from home, others simply did not have the space nor the resources for remote working while also home-schooling children. The elderly, who perhaps for decades have relied upon physical public services, suddenly had to grasp digital skills – in more cases than not, without support from friends or family due to shielding.

The result has been a monumental effort to bridge the digital divide across the country, from both the public and private sector: from removal of broadband data caps, to a £37 million home education fund from government to support low income families. Age UK meanwhile is just one organisation that has offered free IT courses, stay safe online advice and local champions to support digital up-skilling.

Federico Cilauro of Frontier Economics wrote about the economic opportunity that comes from making digital services more inclusive. Widespread adoption of Artificial Intelligence and Internet of Things has the potential to substantially boost UK productivity and standards of living. But he argues that while training is one route to overcoming the divide, there also must be personalised approaches taken to ensure true inclusivity in digital.

This has not all come from businesses and the public sector, however. Again, community members have stepped up to the plate to help each other, with their own tech solutions. Crowdsourcing has provided solutions for collective intelligence according to Globant's Aurelie Lionet; with a Coronavirus Tech Handbook featuring contributions from thousands of people on specific tech challenges people may face in lockdown, available as a free online resource.

For local authorities themselves, implementing more technology-driven solutions is long overdue. Tim Pitts, Senior Partner for Local and Regional Government at Agilisys believes that COVID-19 can and should change local services for good:

“In many ways, COVID has been extremely helpful for local authorities. Remote working and digital thinking were cultural challenges that many struggled with; this has forced everyone into thinking and behaving differently, and shown that change is actually not as bad as feared.”

A massive spike in the need for their services – at the same time as having to digitise the response as much as possible – is a challenge that Tim says local authorities have adapted extremely well to, proving that they can build organisational resilience: “Many services will, as a result of COVID-19, see an increase in demand as unemployment increases, mental health issues arise and so on.

“Building service resilience into processes and services through the use of digital technologies is proving to be of utmost importance, especially as many services have been cut to the bone over many years. They are not in a position to cope with sudden increases in demand, particularly if much of the workforce are off-sick or self-isolating.”

The speed at which local authorities and public services have adapted is impressive. Now, Tim asks: how can councils leverage the increased goodwill towards local government as a result, alongside the efficiency gains and expanding datasets available to them, to create communities that are truly tech-enabled and able to connect everyone?



Recover

Cambridgeshire & Peterborough Combined Authority is leading the way not only in adapting existing services to an increasingly tech-driven world, but in ensuring that its businesses are prepared for long-term digitisation. Its 'Keeping Everyone Connected' workstream included a bid for EU funding for small- and medium-sized businesses to upskill their digital skills and processes – with match-funding from the combined authority itself.

The workstream also includes increased support for citizens in the boroughs and a further roll-out of superfast broadband, including to rural areas in the region.

A further 'Smart Places' work package will introduce smart technology and data solutions to a number of towns in the area of the next 18 months, introducing Internet of Things networks, including SmartPanels to provide real-time local travel updates to the public.

Smart home technology is going to play a vital role in recovery more widely and has already shown the way forward over the past, particularly in energy. With people at home, their reliance on their home energy has significantly increased – offset by lower electricity demands in office spaces and factories.

Smart meters not only make it easier for customers to keep track of their energy usage, but they have played a crucial role in ensuring that energy companies are able to keep their

customers' lights on – according to Joseph Cosier and Edmund Frondigoun of EnergyUK.

With customers unable to leave their homes for a period, and social distancing remaining in place since – the ability for both energy service providers and users to top up their energy supply remotely with smart meters, has helped to reduce unnecessary contact between people. Many companies had even prepared for this, proactively installing smart meters in customers' homes in the weeks leading up to lockdown.

Smart meters also help energy providers to identify their vulnerable customers who are at risk of self-disconnecting their energy supply, as they may be unable or unwilling to top up – putting them at increased risk of negative health consequences.

Lockdown was for a time, the greenest period in post-industrial UK history, with 30% of electricity demand coming from solar energy and a record of almost 68 days without coal usage, up until



mid-June. As people prepare to remain in their homes on a longer-term basis whether for personal safety or continued remote working, we may see these trends becoming permanent.

This will not only provide environmental benefits, but improve the health and safety of UK citizens and keep them connected to their suppliers in a more efficient and hygienic way.

This extends beyond energy, with remote solutions to prevent unnecessary contact between people set to grow. Leonardo Freitas, senior analyst at GloablData believes that touchscreen and push button technology seen at fast food restaurants, train stations and job centres will be replaced by voice recognition and touchless Ultrasonic Data Transmission.

Solutions like these will mean that citizens are able to remain physically connected to one another, leave their homes and travel safely, with a lower risk of contracting COVID-19 – or any other virus.

What we are seeing across the board is an unprecedented transformation in digital solutions and advanced technologies as a result of the pandemic. Public services that have long needed to accelerate are now being forced to and are adapting with aplomb – and are supporting their citizens in skilling-up with them – while innovative private sector companies are uncovering the solutions that will make this transformation a success.



Chapter 3

Securing new ways of working

While millions got to grips with Zoom, Microsoft Teams and Google Hangouts, working in isolation, and no commute, many took for granted the incredible efforts it took in the country's digital infrastructure to make the transition to remote working as smooth as possible.

Companies with decades of data stored on internal company servers had to make that same data secure and accessible to their employees at home. While internet service providers dealt with unprecedented pressure on their home networks.

This chapter looks at the unsung heroes who secured our new way of working and those developing the tools that will allow companies to thrive again in the new digital economy.

Respond

For the country's office workers, the sudden shift to remote working was perhaps the most immediate and obvious change that came as a result of the pandemic.

Figures released on 24 March – just one day after national lockdown was announced – found that previously only 5% of the population were mainly working from home. By the time lockdown hit its peak in April, almost 47% of the UK's workforce had taken up remote working.

On the face of it, this change predominantly affected office-based companies, as well as many stores and restaurants, who had to pivot their business models to new ways of operating – taking more of their processes online whether that be their meetings or the endpoint delivery of services.

But while it was less than half of the country's workforce that had directly changed where and how they were working, the downstream impact of this was almost universal and even more immediate.

Behind the scenes, data centres emerged as the unsung heroes of the immediate COVID-19 response, without whom the entire UK infrastructure that allowed for remote working would have collapsed. Data centres are the backbone of our digital economy – enabling supermarkets to resupply, retailers and banks to process payments, delivery companies to manage logistics and government to deliver their services.

Yet very few of the UK's almost 300 data centres had been formally designated critical infrastructure status prior to the pandemic, meaning that as the country moved into lockdown, there was a threat that the staff who keep this essential service running may have been unable to continue working:

“Most of our barriers in the early-stages were ensuring that government restrictions didn't stop access to data centre sites,” says Emma Fryer, who has led techUK's work in ensuring the continued operation of data centres. “At operator level, the key priority was to balance staff safety with availability. So, the emphasis was on limiting routes for infection whilst ensuring that facilities remain adequately staffed.

“We negotiated key worker status for data centre staff, with a fast and effective response from DCMS who worked across government to allow them quarantine exemption and to keep construction projects going.”

A further response from techUK to support data centres was the implementation of ongoing weekly calls, to share best practice and identify challenges. This allowed operators to compare notes on how they are identifying and managing COVID-19 risks and on the precautions they were putting in place around quarantine and decontamination, as well as HR and supply chain issues, and the security of utility supplies.

techUK's campaigning work was crucial in the Department of Digital, Culture Media & Sport establishing a bespoke unit to maintain the sector throughout lockdown and in turn, ensuring that the capacity was available for more and more businesses to pivot their operations online and remain connected.

While data centres ensured the capacity was available for remote working, IT services providers like Wipro and Tata Consultancy Services – both Indian multinationals working with clients globally – had to make the double pivot of taking their own operations remotely in offices around the world, while responding quickly and efficiently to each country's individual barriers to remote working, to enable this for their clients.

“Moving to remote working globally is a hugely technical endeavour,” explains Rory McCormick, chief of staff, UK & Ireland for global IT, consulting and business process service company Wipro. “Within a week all of our customer engagement and delivery work moved online. This meant ensuring we had sufficient internet connectivity not only in the UK but around the world to enable this.”

Adapt

Although earlier groundwork meant the building blocks for full remote working across the IT sector were in place, Rory McCormick says that prior to lockdown, this was only being used to a fraction of its capacity. “The unknown was whether scaling up to 100% would be effective.”

Naturally, the transition was not completely smooth: “The biggest challenge has been consistent bandwidth. Service providers have done a good job, but the constant use of it through video calls just eats up data, and so it can be a struggle to maintain an optimal level of conversation,” Rory adds.

Emma Fryer explains that this was to be expected: “Anyone supporting cloud services has seen a massive upsurge in demand. There was something like a 900-2000% increase on platforms such as Microsoft Teams and Zoom respectively. If you were having to provide 20 times more of any other product than you had in the past you’d struggle.

“So, stumbles were to be expected, but overall the infrastructure has adapted remarkably well, considering the sheer volume of demand.”

The proof is in the data centres themselves, where no reported data outages in the UK and only an estimated 3% globally were directly attributable to COVID-19. But while the infrastructure proved incredibly resilient, a number of new challenges emerged for which innovative solutions had to be found.

Primarily, for companies who had to continue their on-site operations, business as usual was simply no longer safe. Social distancing measures meant fewer staff could be in the workplace at any one time, and yet there was an increased pressure on stock and personnel as a result of the upsurge in online sales.

Peter Devery, Tata Consultancy Services’ director of communications, wrote how the consultancy helped its clients adapt to this, introducing its Secure Borderless Workspaces® (SBWS®) technology to manage warehouses and delivery. This provided remote access for employees, a suitable cyber security framework and all the project management systems needed to ensure that work allocation, monitoring and reporting continues as normal.

The result was enabling 95% remote working for organisations that would have previously had virtually none, keeping employees safe while maintaining strong client services. The vision is that in five years, staff will only need to spend 25% of their time on-site, only 25% of a team will need to be in one location, and alongside this there will be a 25% boost in productivity and outputs.

One of the greater challenges of a more distributed workforce are the cyber security consequences.

Rory explains: “Companies are having to replicate their security oversight in a remote working or hybrid working environment, including in industries where there are strict regulations around the data employees can access from home, such as financial services.

“They have had to get approvals in place for people to take customer data home with them, when before they had to be in a secure building. Having to adapt to that has taken longer than other changes and has required increased flexibility.”

With regulations overcome and data more distributed, the next challenge is securing that. Between February and April, there was a 22% spike in cyber attacks, no doubt in part due to the transition to remote working and the vulnerabilities this exposed – with more personal devices being used for work, or work devices operating on more vulnerable home or public networks.

“This has made fraud protection significantly more challenging,” adds Laura Bailey, chair and co-founder of fintech company Qadre. “You don’t want to put staff, consumers or any data at risk and so companies are having to expediate their innovation.”



Recover

The success of the transition to remote and hybrid working models means that a full return to the office may never happen, and so solutions must look at how to get the best out of a distributed workforce, and that includes more secure ways of protecting data.

Blockchain may provide the answer. By implementing blockchain technology, every transaction a company makes, every piece of data, can be encrypted and secured – allowing it to be shared in a way that prevents it being compromised.

With Qadre, Laura Bailey has been helping small- and medium-sized businesses across the country since 2013 through its Huski platform to securely communicate their data. With the pandemic presenting new and more widespread challenges, such as the remote verification of customer identity, Qadre is using Blockchain to develop a remotely verified KYC (Know Your Customer) solution. This will allow professional and financial services companies to verify their clients' identities remotely, securely and at a low cost – to minimise physical contact.

The company has already built a further platform that will not only make company data more secure, but maintain and improve their governance for the long-term, and protect them from capital losses.

“We decided to fully focus our whole business around how the UK can thrive in the new normal,” Laura says. “We developed our QCap system, which manages capitalisation tables for SMEs. Many are having difficulty getting vital funding at the moment, and they need a clearly laid-out visual representation of the company’s shareholding and finances to secure this.

“QCap offers this, meaning potential investors can easily access and understand a company’s governance and means, while making it easier for founders to update their structure when this is needed.”

QCap was developed following independent research from Qadre and techUK, which established how widespread an issue this was: “Many cap tables were done in Excel or even on the back of a napkin, because when you first open a company, the shareholding structure is likely very simple,” Laura adds. “But as a company grows, these must be updated and ultimately many companies cannot do so without the right tools to manage this – or they find it takes them away from the day-to-day running of their business.

“We offered this for free for the first year for 100 users to ensure companies who have been hit hardest by COVID have a tool to keep their shareholders updated.”

At a time when funding is more important to small businesses than ever and the attention of founders and CEOs is on survival and pivoting to new ways of working, highly-secure and efficient tools like this can go a long way to powering economic recovery. QCap is but one of thousands of examples that is making this happen – allowing founders to focus on the day-to-day running of their business.

Rory McCormick is positive that innovations like this will make remote working a successful, long-term reality: “These working models are here to stay. There has been a complete change in mindset – from thinking that new ways of working like this could never happen or work well, to seeing that they can, and so what we are seeing is investment in new collaborative tools to make this change last.”

Laura is similarly optimistic. “We’ve got to be. Yes, people have been plunged into a situation they never thought they would be, but out of that comes creativity and entrepreneurship, and solutions to make this easier. The needs of society have changed and it has been incredible to see businesses find a gap, pivot, and realise they can do something that matters in the economic recovery.”



Chapter 4

Data's role in the pandemic healthcare response

As technologies have advanced, more sources of data have become available than ever before, providing businesses with greater insights into their employees, customers and wider stakeholders, and governments into their populations. This is no different in healthcare.

In this report, we have already looked at the advancement of new technologies within the UK health sector. This chapter takes a more detailed look at the benefits – and the risks – of greater data collection, curation and collaboration in the healthcare response to the pandemic, and how COVID-19 has changed how data impacts our daily lives.



Respond

The volume and size of data being created is increasing at pace. A global market valued at just \$7.6 billion (£5.75 billion) in 2011 is projected to have grown more than eight-fold by 2021, and will top more than \$100 billion (£75.5 billion) by 2027 – as a result of the fast-growth of artificial intelligence (AI), Internet of Things (IoT), cloud computing, mobile data and more.

The impact of such growth does not come without risks, but in the context of the COVID-19 pandemic, data has been one of the most influential tools in the response to the virus.

This is not a new phenomenon. For several years, companies have been using data to solve the challenge of untreatable diseases. “We use data in a number of areas within drug discovery,” says Gareth Jones, VP of Intellectual Property at BenevolentAI. “From understanding the biology and mechanisms of a disease, to generating novel chemistry and new medicines, to stratifying and understanding different patient groups and seeing how they respond to different treatments.”

Enter AI: a technology that can process huge amounts of data. Augmented with the skills of leading scientists, it can be used to deliver faster drug discovery while bringing down the risks of developing cost-effective medicines.

“The amount of data that scientists need to understand even one area of drug discovery is a phenomenal amount,” Gareth adds. “There are around 10,000 scientific papers alone published

every single day – and that’s just one type of data that can contribute. You also have to look at clinical and omics data, patient databases, new patents – there are so many sources that it simply isn’t manageable for individuals to process this and discover new treatments. AI can help.”

DeepMind has been one company that has been pioneering in its response, using its AI-powered AlphaFold technology to power computer simulations of protein folding – the process in which a molecular structure assumes a functional 3D shape. It is a crucial step in understanding how to treat any disease, and missing it would be akin to building a house without a blueprint.

However, this is no straightforward blueprint. There is a near unlimited number of shapes any 3D molecular structure can take, and so running computer simulations is a far more efficient way to do this – not least because if humans were to test all of the structural possibilities of a molecule, it would take longer than the current age of the universe.



AlphaFold is perhaps the most advanced computer simulation of protein folding, due to its use of AI to make structural predictions for this virus based on its genetic sequencing, using self-learning neural networks to improve accuracy with each simulation.

Importantly, this technological breakthrough is underpinned by open source data, not least the genomic code of the virus released by Chinese scientists after the initial outbreak. This shows that while there has been an explosion in the amount of data we are seeing, unless it is shared effectively it cannot benefit healthcare response. This has been a major challenge across sectors for a long time, but the pandemic has woken many up to the importance of doing this.

Kate Lindley, Digital Specialist for Local Government and Housing at Civica, explains: “While every organisation understands the importance of data, not all have fully appreciated the value of having up to date, accurate data until the pandemic, when we saw a raft of new patient and community data across a raft of different systems.

“This made it difficult to identify people who were most vulnerable or susceptible, particularly where they’ve not got existing multi-agency data sharing agreements in place. So, there’s had to be a degree of support and enablement provided around data governance in those areas to enable more effective sharing.”

Dr Ian Denley, joint CEO of System C Healthcare,

explains how in partnership with Graphnet Health, the two companies have formed a care alliance that addresses this challenge, creating a shared database of tools, helping to support the response to COVID-19.

“We take pathology and clinical data from GP practices, hospitals and out of hours providers, and put this into a large repository used for shared care between scientists, clinicians and public health officials. They can look at patterns from different regions to understand how the virus is behaving, which is vital in identifying geographic hotspots, high-risk groups and lifestyle factors that impact severity.”

Dr Denley adds that whilst the pandemic has been an incredible challenge, it has come at a time when data processing and management has vastly improved: “techUK has been influential in pushing the interoperability agenda for several years, meaning we now have real-time data that we can respond to. Patient information can be in a cloud system within hours, where previously it may have taken days or even weeks.”

Adapt

Like in every aspect of society, researchers have had to pivot the use of data and AI in drug discovery. “The most important thing in the short-term was not developing new medicines and treatments,” says Gareth Jones, “the key was to identify existing drugs that could treat COVID-19 so we could act faster.”

BenevolentAI helped to identify the drug baricitinib, a rheumatoid arthritis treatment. Large-scale trials demonstrated that when used in combination with the anti-viral medication remdesivir, it reduces recovery time for hospitalised patients: “Our initial research took just 48 hours, and it went from the computer to clinical trials within a couple of months. That kind of pace is unheard of in pharma and it was driven by AI, which helped us to scope a huge number of data sources,” Gareth adds.

“One thing we tried to do was publish our research as soon as possible in peer-reviewed journals and that sharing of research accelerated trials. That’s been true throughout the pandemic and by sharing it has helped others to progress all sorts of solutions.”

In a similar vein, the unprecedented speed of vaccine development has been possible only as a result of Chinese scientists’ willingness to share the genetic code of COVID-19 as early as January.

A further acceleration has been in people’s understanding of data and their willingness to provide it, says Dr Ian Denley.

“The use of data for operational purposes has really accelerated this year due to COVID-19, because the need was so great. Clinicians are more willing to share it and patients are more au fait with their rights,” he suggests.

“They feel strongly that it can help and is a valuable tool, and trust health bodies to use it in their best interests. That is better understood than even this time last year, and so we have been able to significantly accelerate the use of real-time data.”

Dr Denley adds: “There remains some sensitivity around the use of data for secondary purposes, because people fear their clinical data leaking out to third-party companies, but we have worked hard to develop a safe and well organised framework for this.”

Perhaps one of the reasons people are more willing to share their clinical data, is that it has increasingly become a part of their daily lives. It has informed government decision-making around what level of lockdown measures should be put in place, as well as when and to what extent businesses should re-open, and allows for efficient contact tracing.

In turn this has extended to everyday public behaviour.

“For the first time, ‘the man on the street’ is actively thinking about data,” says Rory McCormick, Chief of Staff, UK & Ireland for Wipro. “The day-to-day data around the rate of COVID-19 infections now informs how we go about our daily business. Our lives are shaped by data.”

Rory suggests that a reason for this is the absence of any prior event comparable to the pandemic in our lifetimes. “In the past you might have made decisions with the help of data, but there would be a level of lived experience or ‘gut feel’ that would inform how you acted. This pandemic however is a once-in-a-lifetime event – there is no prior experience to relate to and explain what we should do next. Without that gut intuition, data becomes more critical.”



Recover

What does this greater reliance on data in people's daily lives mean for the long-term of the industry? "Data analysis will move away from the pre-pandemic approach of using data to 'rubber stamp' gut-feel decisions," says Rory McCormick. "Now it's very much going to about using data as the main driving force in arriving to a decision through quick and iterative hypothesis testing through targeted data analysis."

But data provides complex challenges and costs as well as opportunities, particularly around privacy, consent and protecting individuals who provide that data. "Managing data has become an incredibly important, high-skilled area. It takes a lot of effort to collect, cleanse and curate, and we cannot expect the companies who are doing that to do so for free. They will need to be compensated in some way and managing that can be difficult," explains Gareth Jones.

"The risks associated with widespread data use and sharing needs to be taken seriously in the healthcare space where privacy is important, and if you're working with large volumes of data the risk only grows. You need the right type of skills at a technical and operational level to make sure people are trained to handle that data correctly."

Part of the challenge is in the outdated terms in many data licencing models, which can make the use and sharing of data challenging. Modern licences that remove any barriers or ambiguity on how data can be used will make it easier to be used in new technologies like machine learning.

But Gareth is optimistic that people will continue to gain a better understanding of how important their data is and the value of sharing that for future discovery: "We at BenevolentAI are not the only ones who have shared their research. So many companies have done the same to create much larger sources of open data – the Allen Institute for example has shared tens of thousands of papers. It's been really exciting to see people leveraging that."

"The pandemic is such an awful thing but positives have come from it and one of those is seeing that the more we share data, the more benefit people can get from it, and the more we can solve for the future."

Data and AI has also proved fundamental to the response to the second wave of the virus, not only in terms of direct responses to COVID-19 – such as drug discovery, vaccine development, contact tracing, outbreak prediction, treatment and diagnosis – but in ensuring the health service can operate at full capacity.



Dr Ian Denley explains: "We have had to work out how to get the NHS back to normal and stop treatments in other areas falling behind as it did in the spring. All the dashboards and data we have been pulling together put us in a place to deal with local outbreaks, understand the reasons some get sicker than others, managing the discharge process, secondary infections and much more."

He adds: "In some ways we were fortunate that the initial outbreak came through spring and summer, meaning we weren't challenged with the usual winter pressures on the NHS. That is what we face now though, and so we had to be in better shape. I believe we are far better prepared."



Conclusion

Julian David, CEO, techUK

This pandemic is an unprecedented challenge, but what we hope to have demonstrated here is the unprecedented collaboration and innovation that has come in response.

One of the clearest take-aways for me has been the importance of our existing capabilities in ensuring industries could respond, adapt and recover effectively. Without the digital infrastructure that we have, without the digital tools – mobile phones, laptops and tablets and the apps that run on them, many of which are relatively new – then that ability to move whole sections of society and the economy online would not have been possible.

Even five to 10 years ago, we would not have had as wide an ability to service people digitally, nor to keep people connected in periods of isolation and lockdown.

The fact that large parts of our economy were already digital, particularly in financial and professional services and many educational services, meant they were able to pivot and carry on quickly. For others like our healthcare and social services, it was a case of scaling up existing capabilities to full capacity, a challenge to which they have risen.

The UK's digital infrastructure, the companies supplying digital services and the public in adapting to a 'new normal' have rated among the best in the world. We have been able to maintain our infrastructure and our communities very well and I would compare our response with best practice anywhere.

There is of course still so much more we can learn from others and there's still areas for us to focus on. It is no longer acceptable for more than four million people in the UK to be digitally excluded; we cannot leave anybody behind and must ensure those who do not have access or do not understand technology, are given the tools to use it.

If we succeed in doing this then the millions who are seeking jobs in the wake of this pandemic will find extended opportunities in a technology industry that is saying 'come on in'.



Moving forward

This is a chance to change that, and so we are calling on the entire industry and government to rebuild the UK as a nation absolutely replete with digital skills – a country that is a producer of them, not just a consumer.

There has been a huge shift in attitude among businesses, government and public sector organisations, who are embracing the new and finally entering the 21st century. I see that in businesses, as well as in our surveys to the public. It is clear they want to acquire these skills, become more digital and use them to be a part of and to grow new industries.

I also see it in government policy, if you look at the recently signed trade agreement between the UK and Japan, there is a section that very explicitly commits both countries to say 'we are going to build a digital connection between us', as well as a connection through physical goods and trade. It is a signal of the future that a commitment to tech innovation is built into our trade agreements.

You also see this in pronouncements from the government around investment and the commitment to increase the R&D spent in this country to 2.4% of GDP. And we think it should go beyond that.

What I know, is that the solutions will arrive if we determine that technology is the right way to solve problems and if we work together as a community to make that happen.

Now is the time to say we are going to do this and make sure that every region and person in the UK is a part of this transformation. The 2020s were always going to be the digital decade; the pandemic has accelerated that in a way we could not have foreseen nor would ever have wished, but there are reasons to be optimistic as we move forward.

I believe you have seen just a snapshot of those reasons in this report and I'd like to thank everyone who contributed in showing what can be done in challenging times when we collaborate to build for the future we need.

Thank you

techUK is working with its members to fight COVID-19 through our Respond, Adapt, Recover strategy:

Respond: to the immediate needs of the public health crisis.

Adapt: to the impact of a society in lockdown.

Recover: supporting the rapid economic and societal recovery and reinvention needed for all.



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