

The background of the page is a complex geometric composition. It features a grid of squares and rectangles in various shades of grey and white. Overlaid on this grid are several teal-colored shapes: a large curved shape in the top left corner, a smaller curved shape in the bottom right corner, and a vertical teal bar on the right side. The overall aesthetic is clean, modern, and data-oriented.

The role of digital transformation on the UK economy: **Health Sector**

A Cebr report for Virgin Media Business

March 2021

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London, March 2021

Contents

Executive Summary	4
1. The impact of COVID-accelerated digital adoption	6
Health sector	8
2. VMB case studies	10
2.1. Richmond/East London	10
2.2. Therapy Box	12
2.3. Moorfields Eye Hospital	13
2.4. NHS Digital	14
3. Literature review and panel insight	16
4. Industries in Practice	19
Remote working in the health sector	19

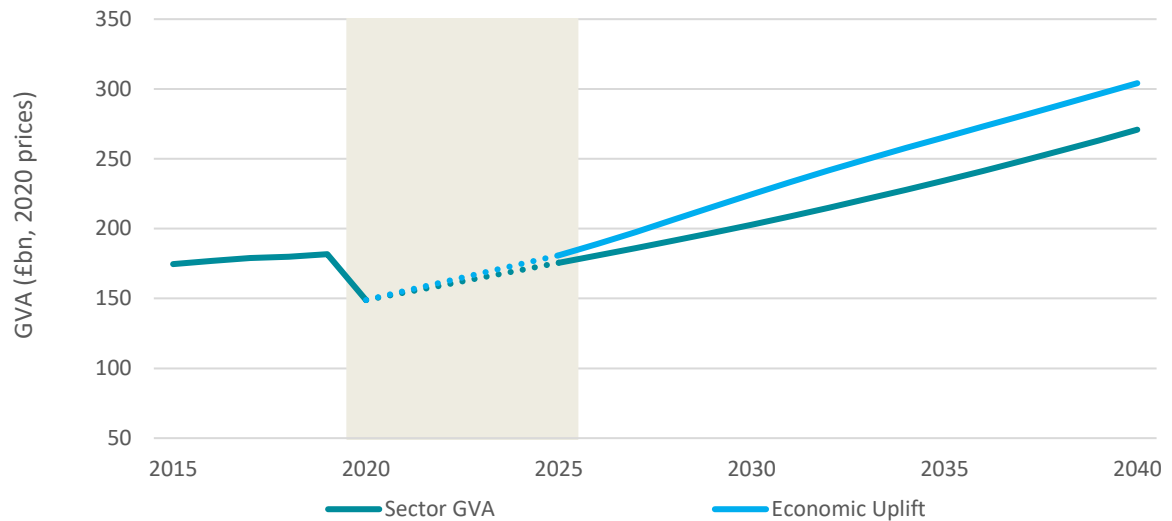
Executive Summary

- This is a Cebr report for Virgin Media Business on the impact of Covid-accelerated digital transformation (CADT) in the **health** sub-set of the public sector.
- Following the release of Cebr's extended report for Virgin Media Business on the topic of [Covid-accelerated digital transformation](#), and its impact on the UK economy more broadly, this report serves focuses on the **health sub-sector**.
- This is the second in a **series of sector-specific vertical reports**, providing a review of the role that digital transformation is expected to play in accelerating the UK's rebound from Covid-19.
- Within **health**, we consider the wider **health and social care sector**.
- As detailed in the main report, increased adoption of key digital technologies due to the pandemic could lead to a period of Covid-accelerated Digital Transformation (CADT). **Boosted investment and fast adoption of CADT technologies over the coming decades is set to increase UK GDP by £232bn¹ or 6.9% by 2040.**
- We find that approximately **one third of economywide tech-enabled growth** will be supported by public sector investment in the **three** public sub-sets that were analysed in the wider report (local and central government and blue light services, education and healthcare). This is an increase to **economywide GDP of £75bn, or 2.4% in 2040.**
- Of this approximately **£33bn originates from activity in the health subsector**. This GVA boost will be realised across the whole of the UK economy, representing an **uplift of approximately 1.0% of UK GDP in 2040.**

¹ All figures are presented in 2020 prices.

- **Figure A**, below, sets out the **forecasted size of the health sector** under the **baseline scenario**, together with the **estimated size of the cumulative gain** which will be **realised across the whole UK economy**, as a result of **accelerated digital transformation in the health sub-sector**.

Figure A: Health sector GVA, 2015-2040



Source: Cebr analysis

1. The impact of COVID-accelerated digital adoption

This section sets out the findings of the research, that is, the estimated sector-specific impact of accelerated adoption of digital and technological initiatives, in response to Covid-19, estimated over a 20-year time horizon.

For reference and context, Table 1 sets out a summary of the results for the whole of the UK economy, after which the health sub-sector results are presented.

Table 1: UK-wide impact of post-Covid digital transformation adoption

Year	Baseline GDP (£bn, 2020 prices)	Uplifted GDP (£bn, 2020 prices)	Additional GDP (£bn, 2020 prices)	Percent Boost
2020	2,178	2,178	0	0.0%
2025	2,651	2,725	74	2.8%
2030	2,891	3,018	127	4.4%
2035	3,143	3,314	171	5.4%
2040	3,361	3,593	232	6.9%

Source: Cebr analysis

The 2021 – 2025 short run

It should be noted that this research has been carried out in real-time, against an uncertain economic backdrop with particular respect to the long-awaited Brexit deal announcement, and indeed Covid-19 – the surrounding circumstances of which have been subject to frequent and last minute change. Results are estimated using assumptions that are based on the state of the world at the end of 2020, and the near-term forecast might consequently be subject to change.

As noted in Cebr's [extended report](#), the shape of 'economic recovery', in the period 2021 – 2025, is uncertain.² Opinion ranges from a quick 'V-shaped' to a prolonged period of lower output. This uncertainty is largely due to the unpredictable progression of the virus and governmental responses. While a fast and effective rollout of vaccines may allow for a return to normality and a quick economic recovery, prolonged restrictions well into the second half of 2021 would lead to greater scarring in the economy and slower economic growth in the following years.

We have therefore placed greater focus on the medium and longer-term findings by excluding annual estimates for the years between 2020 and 2025. Longer-term findings are more robust and less likely to be impacted by the current – and ongoing – changes to government policy and pandemic trajectory. By the start of the long term steady state period (currently estimated to be 2025), increased Covid-accelerated Digital Transformation is estimated to have added £74bn to GDP.

² The immediate term between 2021 and 2025 can be thought of as the of the 'economic recovery' period, before the UK transitions into a long term steady state. 2025 has been chosen as a suitable analytical starting point from which to undertake the analysis because that is the nearest steady state marker that is currently identifiable.

It can be seen in Table 1 that under the baseline scenario, sectors operate under normalised, assumptions, following non-accelerated technological usage trajectories. In this case, GDP across the UK economy as a whole is estimated to be approximately £2,891bn by 2030. However, the results of the model in which we consider accelerated technological adoption, indicate that GDP could increase to approximately £3,018bn – an uplift of £127bn, or 4.4%.

By 2040, the counterfactual GDP – with normalised assumptions regarding technology adoption – is estimated to be approximately £3,361bn. However, with increased used of digital technologies, it could be uplifted by around 7% to £3,593bn – an increase of £232bn.

As detailed in the extended report, the public sector is treated differently from the private sector. The uplift accruing to increased adoption of digital transformation in these government-dominated sectors is expressed with respect to its impact on wider UK sectors. Any innovation that raises either the quality or the quantity of output from the public sector), will not necessarily directly boost the GVA of that sector, rather, it is assumed that the benefits achieved can be expressed as cost savings in each year for the respective public sub-sectors. The cost savings are then invested and re-invested across the sector each year, the economic yields of which will be realised as broad-based benefits across the wider UK economy.

Table 2 summarises the impact of accelerated technological adoption across the three public sector sub-sets of interest: LCGS,³ education and healthcare.⁴

Table 2: Impact of accelerated digital transformation in the education, health and LCGS sub-sectors of the public sector

(Real, £bn, 2020 prices)			
Public Sector	Size of sector in 2040	Economywide gains attributable to public sector investment	Gain as a % of GDP
Local and Central Government and Blue Light Services (LCGS)	121	32	1.0%
Education	151	10	0.3%
Health & Social Care	270	33	1.0%

Source: Cebr analysis

It is estimated that by 2040, increased adoption of digital and technological initiatives in the **health** sector could increase GDP across the economy by around **£33bn** – a gain of approximately **1.0% of GDP**. Across education, GDP gains (to be realised across the overall UK economy) are estimated to be approximately £10bn in 2040. In local and central government and blue light services, the GDP uplift is estimated to be £32bn, or around 1% of UK GDP in 2040.

³ 'Public administration and defence' (as defined in Cebr's macro model) can be considered an appropriate proxy for 'LCGS' in the context of this analysis.

⁴ Per the scope of the research, we have considered only three sub-sets of the broader public sector. It should be noted that the activity of these three sub-sets is not the complete extent of public sector activity.

Health sector sets out the estimated size of health sector gains. Gains originating from sub-sets of the public sector, such as the health sector, will be realised across the wider UK economy.

Table 3 sets out the estimated size of health sector gains. Gains originating from sub-sets of the public sector, such as the health sector, will be realised across the wider UK economy.

Table 3: Impact of accelerated digital transformation in the health sector – in terms of economywide gains

Year	(Real, £bn, 2020 prices)		
	Size of health sector	Economywide gains attributable to public sector investment	Gain as a % of GDP
2020	149	0	0.0%
2025	176	5	0.3%
2026	181	8	0.4%
2027	186	12	0.5%
2028	192	15	0.6%
2029	197	18	0.7%
2030	203	22	0.8%
2031	209	24	0.9%
2032	215	27	1.0%
2033	221	29	1.0%
2034	228	30	1.0%
2035	234	31	1.0%
2036	241	32	1.0%
2037	248	32	1.0%
2038	256	33	1.0%
2039	263	33	1.0%
2040	271	33	0.3%

Source: Cebr analysis

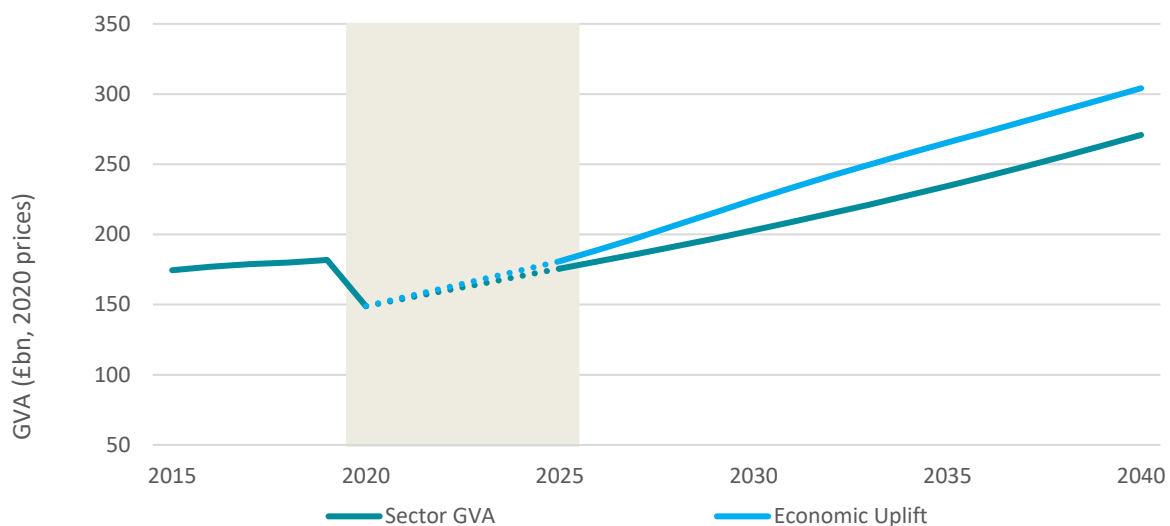
It is estimated that by 2040, increased adoption of digital and technological initiatives in the health and social care sector could increase GDP across the whole UK economy by around £33bn – a gain of approximately 1% of GDP. For context, this is broadly consistent with estimated gains attributable to public sector investment from the local government (defined as public administration and defence), where private sector GDP is estimated to realise cumulative gains of approximately £32bn in 2040.

Estimates from Cebr's macro framework indicate that the total size of the health sector in 2020 is approximately £149bn. By 2025 this will increase in size under normal steady state assumption to approximately £176bn.

The cumulative uplift – which is realised across the whole economy – is illustrated in Figure 1. The delta between the two lines represents the size of the digital transformation uplift that

is attributable to investment in the health sector.⁵ While there might be a number of ways in which the gain is channelled, our scenario assumes that cost savings – examples of which are given in the literature review – are reinvested into the sector. This becomes possible as fewer operational resources are needed to provide the same quality of healthcare as currently provided.

Figure 1: The impact of accelerated digital transformation in the health and social care sector



⁵ On the basis that the health sector is substantively government-run, our scenario employs a simplifying assumption in which we treat the whole sector as a public sector sub-set. The same is true for the local and central government and blue light services and education sectors reported on in separate verticals.

2. VMB case studies

The following case studies supplied by Virgin Media Business serve to demonstrate the forms of digital transformation organisations working in throughout the public sector have successfully implemented throughout Covid-19.

2.1. Richmond/East London

The rise and rise of virtual healthcare, and improving patient outcomes

Covid-19 accelerated digital transformation in clinical settings, even improving some services during the pandemic. And for many medics on the frontline there is no going back.

Dr Ben Wright, Lead Clinician for the Richmond Wellbeing Service, says: “We have gone to an entirely digital service. For patients who don’t have digital assets, we developed digital pods. We repurposed some of our smaller clinical spaces with Webex boards.

“Patients with no digital skills can come in, have a virtual face to face consultation and go. It addressed the gap between those that have and those that don’t.

“I require that clinicians offer virtual face to face consultations. Not just phone calls. We found an improvement in clinical delivery. It really helped the outcomes.

“Now, with virtual consultations the personal cost of having an appointment is so much less. So, more people are able to have treatment and to benefit from it.”

He thinks this trend will continue long after the pandemic. Dr Wright explains: “My prediction is that 70% of mental health consultations will remain virtual and 20% delivered through digital pods.

“At these community venues these digital pods offer people a high quality, virtual consultation. In the future I think these pods may have medical equipment like an ultrasound probe, or high quality microphones so patients can self examine.

I estimate that only 10% of mental health consultations will be face-to-face.”

Dr Wright is now Chief Clinical Digital Officer with East London NHS Foundation Trust. There he works at the interface between clinical and digital practice.

He is a strong advocate of digital change. And has first-hand experience of the challenges faced by those determined to bring it about.

Dr Wright says: “The Covid phenomena created very strong organisational engagement. But the strategic will and concerted delivery lag behind. There is so much more value we can extract from digital, if we go about it in a systematic way. The challenge is to go from good to great.

“There is a fantastic commercial opportunity for companies like Virgin Media Business and other suppliers to jump into the gap and really address the need.”

From paper and ink to digital-first: the increasing pace of transformation

The pandemic has proven to be a catalyst for change in healthcare, bringing forward innovations that may, in other circumstances, have taken years to enact.

Dr Wright has first-hand experience of that increasing pace of change, as a digital pioneer right from the days when the NHS was mostly a paper and ink organisation.

Now, as associate medical director for clinical information at East London NHS Foundation Trust, he is responsible for helping to drive a culture of innovation.

He and his colleagues deliver cutting edge primary and secondary care across more than 150 sites, serving a population of 2.5 million.

Dr Wright says: “I sit at the interface between clinical and digital practise. But I've got a long background in digital.

“I got into digital during my final year at St Thomas’, when I saw a typed invitation to apply for clinical informatics.

“Back then I had access to the only computer in the building. I was able to use it and I realised this was going to be the future...I've always seen the potential.

“But I think the challenge around digital transformation is not in its potential, the challenge is in the realisation...and getting sufficient momentum.

“If your organisation doesn't have strategic will, it won't make available the necessary resources and it won't orientate the organisation to engage with the digital process.”

The pandemic changed all that.

“My prediction is that 70% of mental health consultations will remain virtual.”

Dr Ben Wright, Lead Clinician for the Richmond Wellbeing Service

Dr Wright continues: “What Covid has changed is the organisational engagement. It forced people to make the change. Now we can't go back to the historical path of least resistance.

“The wholesale move from face-to-face work, to simply not being able to see each other and working from home, meant organisations had to enable that digital infrastructure.”

And he believes that this switch to more digital has led to improved health outcomes for many.

Dr Wright says: “There are multiple dimensions in which digital improves quality of care delivery: information access, information coordination, information transformation.

“It can be really helpful. And that's just the really basic stuff having information about the patient and working collaboratively with other agencies.

“But there's also the broader access to world knowledge on health systems which is really important as well.

“For example, our e-prescribing programme is a success. It's realising many of the benefits in terms of patient safety, consistency and information tracking.”

Virgin Media Business has partnered with East London NHS Foundation Trust since 2013.

2.2. Therapy Box

The problem-solver's guide to digital healthcare

There's a reason healthcare today benefits from so many practical innovations forged during the pandemic: our frontline medics are natural problem-solvers.

Speech and language therapist Rebecca Bright MBE believes the digital transformation forced on clinics by Covid-19 is here to stay. And will make for better outcomes.

She says: "In many ways it feels like we've pressed the fast-forward button. Because people had to do it, everyone got on board. The things we were hoping for happened.

"Barriers have been removed. Things have been fast-tracked. It's probably a good thing. Now everyone will benefit from a positive attitude towards how we use technology."

Rebecca's MedTech company Therapy Box helps those who struggle to communicate. Its apps, research and data monitoring have proved invaluable to health professionals.

The company's agility and mature use of technology and remote working meant it already had the tools to survive and thrive during the Covid crisis.

Smart innovation is more important than simply throwing money at a problem.

Rebecca explains: "We've been able to maintain our projects and deliver them on time and on schedule.

"Our bigger competitors have face-to-face customer meetings built into their cost. While they have big communications budgets, we always tried to do stuff online.

"People used to be a bit reluctant about online training, they felt like it had less value. Now people are much more willing to do that."

She adds: "We were involved in research projects where previously the plan was to see the patients. Now, we've built it into our technology. You can have the session within the app itself.

Smart innovation is more important than throwing money at a problem.

"Otherwise research projects would have ground to a halt. Patients won't be coming through the door for a long time. That's quite a barrier to research."

Therapy Box already shares its new-found online research experience with other teams around the country, helping others take advantage of the lessons it learned.

Rebecca says: "This will now become the routine way of working. People are more open-minded to try new things.

"From now, we'll use a mix of face-to-face and remote service delivery. Online will suit some better than others. But the option's there. And that's the good thing.

"I think clinicians are good problem-solvers. They are, by nature, trying to identify the problem and what can we do to solve it. They have the right attitude and skills. And they're keen to adapt."

[Therapy Box](#) was one of the winners of Virgin Media Business's VOOM competition in 2018. Its apps are already estimated to have saved the NHS more than £6 million.

2.3. Moorfields Eye Hospital

How digital innovation helps put patients first at the UK's leading eye hospital

Patient experience is a number-one priority for healthcare in a digital age. And that's increasingly true for both face-to-face and virtual consultations.

Frontline workers at Moorfields Eye Hospital, London, lead the way on both fronts.

Staff use virtual reality headsets to see first-hand the real challenges faced by patients, with workshops and training sessions helping fine-tune how they respond to them.

Sarah Needham, Deputy Director of Nursing at Moorfields, says: "For the first time, we have the ability to walk in our patients' shoes and learn from their lived experience.

"[It's] the perfect tool for us to recreate real-life experiences in a way that was previously impossible with traditional training methods."

The 360-degree VR films include scenarios ranging from the waiting room to the operating theatre, and even explore methods of breaking bad news.

Sarah continues: "Each scenario will reflect good and poor practice and allow the user to feel what it is like to utilise our services with sight loss.

"We're really excited to be using immersive technology to improve staff and student engagement whilst giving them more confidence and a deeper understanding of our patients' needs."

But along with many healthcare providers, the pandemic meant Moorfields had to see

many more patients online – a trend that is likely to continue long after the pandemic.

The hospital rolled out an ambitious digital programme to tackle this that was up and running in just two days. It gives patients access to the vital eye care they need without having to travel to hospital.

Moorfields can host more than 600 video appointments a week. Typically seeing patients via their smartphone, computer or tablet, within one minute of logging on to the platform.

Specialists could continue to support thousands of patients with a range of eye conditions, including those requiring follow-up to surgery, as well as running a virtual accident and emergency (A&E) service.

Eight out of ten people were able to get the treatment they needed online, with almost 95% giving the service they received the maximum rating of five stars.

Dr Peter Thomas, Director of Digital Innovation and Consultant Paediatric Ophthalmologist at Moorfields, says: "We're proud that we're able to offer this new service.

"Necessity has forced us to approach problems in new ways and this is a great example of how we can utilise technology to provide a rapid solution."

Chief Executive David Probert adds: "Our virtual A&E provides an all-important lifeline to anyone worried about losing their sight, providing rapid access to our team of specialists without the need to travel.

"Across the NHS, trusts have been innovating at pace thanks to having the right technology at the right time."

2.4. NHS Digital

The day the NHS network got 10 times faster and 20% cheaper

During the Covid crisis, NHS Digital completed the biggest ever public-sector data-network migration and saved around £75 million a year in the process.

Today the Health and Social Care Network (HSCN) connects 12,000 sites belonging to 950 NHS, social care, private-sector and local authority organisations.

Now they benefit from the faster connections vital to deliver health and care services in a digital age. HSCN supports the NHS Internet First policy and the shift to public-cloud-based services.

HSCN has significantly improved connectivity for the health and social care sector across the country.

They can source network connectivity from multiple suppliers in a competitive marketplace and in collaboration with other health and social care organisations.

So frontline workers enjoy faster, cheaper, smarter connectivity.

Patrick Clark, HSCN Programme Director at NHS Digital, says: “This is a hugely significant achievement both in terms of the scale and the benefit of what’s been delivered.

“Reforming long-standing services in order to promote real choice, competition, innovation and value for money is always difficult.

“But the HSCN initiative demonstrates what can be achieved when you work collaboratively across the health and care system, and industry.”

He adds: “The Covid-19 pandemic demonstrated how important it is to

underpin online, digital services with the right connectivity.

“And I’m delighted that the HSCN initiative has enabled so many organisations to upgrade and future-proof their connectivity services affordably.

“Good connectivity is vital for healthcare practitioners, supporting them with faster, more reliable access to the information and services they need, when they need it.

“HSCN now provides organisations with the ideal way to obtain the best connectivity for their staff at the best price.”

Dr Toral Thomas, Consultant Forensic Psychiatrist and CIO at Norfolk and Suffolk Foundation Trust, says: “Our speed has increased up to 10 times faster. This allows us to deliver high-quality care. Spending less time behind screens and more time with our service users.

“It’s given us 10 times more bandwidth at 20% less cost.”

Rob Harder, CTO for University Hospitals Plymouth NHS Trust

Rob Harder, CTO for University Hospitals Plymouth NHS Trust, confirms: “It’s given us 10 times more bandwidth at 20% less cost.

“More reliable connectivity for our clinical systems gives us capacity to share more information.

“The more information our clinicians can share when they are discussing complex patients gives them better ability to provide better patient care.”

Dan Parry, HSCN Lead Migration Programme Manager at NHS Digital, says: “Completing the HSCN migration ahead of schedule and within budget is an incredible achievement, given the project’s size and complexity.

“A great success is seeing the number of local NHS organisations benefiting from significant savings as a result of the HSCN marketplace whilst still being able to upgrade their capacity to fibre-based products.

“This will enable them to make better use of digital tools not only during the pandemic but as part of their longer-term digital ambitions.

“This has been a mammoth task as we switch the lights off on the legacy network and bring HSCN migration activity to a close.”

Virgin Media Business paved the way for [delivery of HSCN](#) with our [Public Services Network \(PSN\)](#). We were one of the first organisations in the country to be awarded the PSN Compliance Certification CAS(T) 2-2-4. We since achieved two-stage compliance for HSCN.

3. Literature review and panel insight

In order to undertake the analysis, it was first necessary to conduct an in-depth literature review of each industry. This enabled sector-specific assumptions to be made which were then further verified through panel interviews and workshops with industry practitioners. These assumptions were used as modelling inputs in support of estimating the impact of accelerated digital transformation on each of the UK sectors of interest.

Section 2 sets out the findings from the literature review, together with insight from the panel workshops and interviews. Of particular importance was data pertaining to current levels of technological adoption, from which it would be possible to determine the counterfactual trajectory, and also the various efficiencies that *could* be realised with the increased use of sector-specific technologies – which would provide an indication of the potential gains that could be achieved with accelerated use, owing to events such as COVID-19.

The literature review and panel insight also provide important background information against which findings from the research can usefully be contextualised.

The coronavirus has had a substantial impact on the health service within the UK and has created a necessity to find alternative means to contact and consult with patients. These trends, however, have not been created by the virus, but rather accelerated.

Many GPs across the country were trialling e-consultations as a way of increasing efficiency and reducing costs of the already over-stretched workforce. Between 2007 and 2014, clinical workload increased 16%⁶ at a time when austerity began setting in and there is an estimated shortfall of 3,300 GPs.⁷

There has been a generally positive response to virtual consultations from a range of pilot studies and qualitative interviews. A 2014 review of Skype consultations found that 94% of patients were satisfied or better with their medical needs being addressed.⁸ The study also found that Skype appointments tended to run on time better than normal face-to-face appointments.⁹

Similarly, a 2016 study in Wessex of consultations through online forms found promising results regarding efficiency and cost savings. The WebGP system allowed patients to fill in an online form that would be responded to within one working day. The response would either be a follow-up call, a face-to-face appointment or a resolution of the query itself.¹⁰

In the first 8 months of the system being introduced, only 0.87% of all consultations were made through it. However, despite the small share of consultations, the actual impact of the system

⁶ Banks. J., Farr. M., et al. (2018). 'Use of an electronic consultation system in primary care: a qualitative interview study'.

⁷ Matheson. C. (2016). 'Implementation of WebGP and E-consultations in Wessex GP Practices'.

⁸ NHS Central London Clinical Commissioning Group. (2014). 'Implementing Skype Consultations in General Practice'.

⁹ Ibid.

¹⁰ Matheson. C. (2016). 'Implementation of WebGP and E-consultations in Wessex GP Practices'.

was a success: 113 face-to-face appointments with GPs were freed up, equivalent to £2,147 when costing a GP appointment at £19.¹¹

Other estimates put the cost of GP appointments at an average of £35.75. Under this cost, the savings of the 113 appointments amounts to £4,039.75.¹²

Another measure of impact from these online forms is in the average length of time to deal with a request compared to the average GP appointment. The forms resulted in an average of 6 minutes to deal with compared to 11.7 minutes for face-to-face consultations; an efficiency gain of 48.7%.¹³

These studies highlight that virtual consultations have the ability to alleviate strain on General Practices through time saved and more efficient means of consultation. The growth of virtual consultations has been such a success that Matt Hancock, Health Secretary, has urged “all consultations should be tele-consultations unless there’s a compelling reason not to”.¹⁴

This should not be an issue per se as GPs found no greater risk burden from e-consultations as they were not forced to treat virtually. If they felt compelled face-to-face appointments were arranged.¹⁵

Beyond e-consultations, digitalisation and technology is advancing health in significant ways. Artificial Intelligence (AI) is revolutionising many aspects of society through reducing time taken to complete tasks the automation of processes and avoiding human errors.

Clinical trials, diagnostics and hospital organisation are three areas that are benefitting from this emerging technology.

The company Atomwise has utilised AI technologies as a way to significantly increase the speed of drug discovery. The AI technology uses a statistical approach that extracts insights from millions of experiments to predict the binding of small molecules to proteins. Using this technology, R&D is not constrained by the limited number of compounds available in a library and can screen and analyse billion of compounds to identify a smaller subset for further testing; this can reduce discovery time from months to weeks.¹⁶

This technology was implemented to help against Ebola and discovered two previously unknown drugs. It did this through analysing 7,000 drugs that interacted with the diseases structure. This analysis would usually take months but was completed in less than a day.¹⁷

With reference to diagnostic abilities, AI is also becoming a valuable tool for doctors. In one study, the AI was programmed to detect signs of eye disease and recommend treatments for

11 Ibid.

12 Ibid.

13 Matheson. C. (2016). ‘Implementation of WebGP and E-consultations in Wessex GP Practices’.

14 BBC. (2020). [‘More Zoom medicine needed in NHS says Hancock’](#).

15 Banks. J., Farr. M., et al. (2018). ‘Use of an electronic consultation system in primary care: a qualitative interview study’.

16 Atomwise. (2020). [‘Our Technology’](#).

17 Atomwise. (2015). [‘Atomwise finds first evidence towards new Ebola treatments’](#).

care. The AI system recommended the correct referral decision for over 50 diseases with 94% accuracy, matching world-leading experts.¹⁸

In a separate study, AI was trained to detect and diagnose lymph node metastases in tissue of women with breast cancer. When comparing the results of the AI to doctors, the AI was 12.4% more efficient in detection.¹⁹

It is noted that the number of scans is growing at a faster pace than doctors can interpret them.²⁰ These breakthroughs in AI technology offer a way to automate the diagnostic processes and allow continuous analysis without the risk of fatigue which may cause human error. This is especially important as human error is the third highest killer in the US and accounts for approximately 10% of all deaths.²¹

From an organisational point of view, AI is also creating large efficiencies. John Hopkins Hospital introduced AI to better its patient operational flow. The hospital notes that since implementation, it has seen a 60% improvement in the ability to admit patients and a 21% increase in patients discharged before noon, improving overall patient experience and reducing the unnecessary longevity of patient stay.²²

18 Moorfields Eye Hospital. (2019). ['Breakthrough in AI technology to improve care for patients'](#).

19 Bejnordi., B. et al. (2017). 'Diagnostic Assessment of Deep Learning Algorithms for Detection of Lymph Node Metastases in Women with Breast Cancer'.

20 Moorfields Eye Hospital. (2019). ['Breakthrough in AI technology to improve care for patients'](#).

21 University of California San Francisco. (2016). 'Big Data, Analytics & Artificial Intelligence'.

22 John Hopkins Medicine. (2016). ['The John Hopkins Hospital Launches Capacity Command Centre to Enhance Hospital Operations'](#).

4. Industries in Practice

Remote working in the health sector

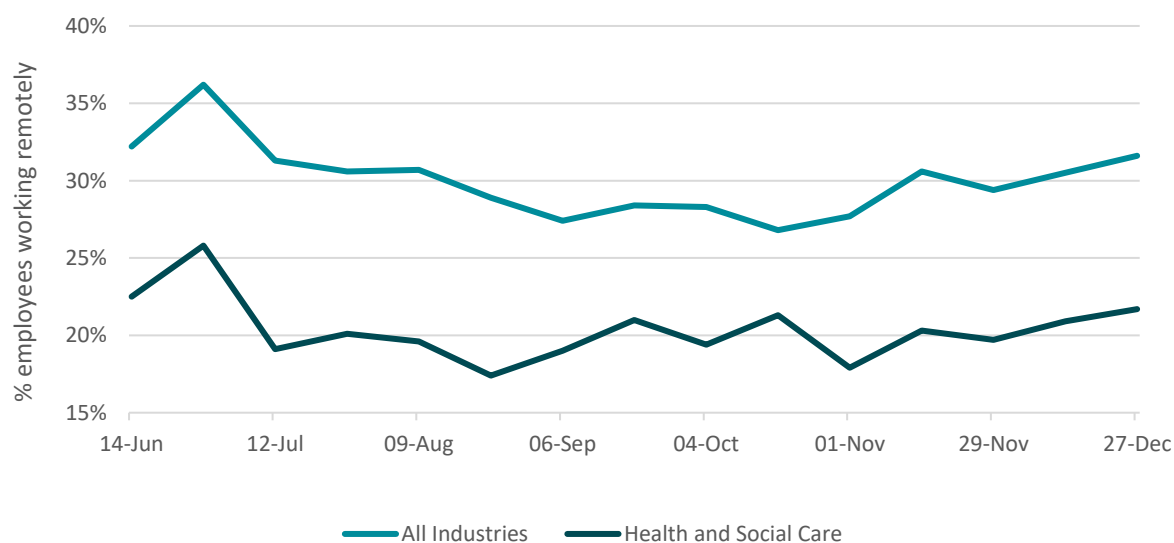
Our analysis of the health sector focuses on the public sector institutions operating within it. However, it is also important to consider the impact on private health and social care providers operating across the sector. Private providers play an essential role in delivering NHS funded services as well as providing care in the wider healthcare sector as well as in the provision of social care.

In order to do this, we use ONS data gathered from the voluntary fortnightly business survey (BICS)²³, which looks at financial performance, workforce, trade and business resilience across UK sectors.²⁴ Although this is a business survey, the trends of private health and social care providers offer insight into the wider sector.

In the context of this research, it is particularly relevant to look at the data pertaining to remote working, and the associated gains and challenges that UK businesses have experienced.

Figure 2 shows the proportion of health sector employees who are working remotely (as opposed to at their normal place of work), together with the average across all industries in the UK. The time frame considers the period from peak lockdown to the end of 2020.

Figure 2: Proportion of health sector employees who are working remotely as opposed to their normal place of work



Source: BICS and Cebr analysis

23 ONS. (2021). [Business insights and impact on the UK economy: 14 January 2021](#).

24 The education sector is defined here as including: private sector and higher education businesses only; it excludes public provision of education and health.

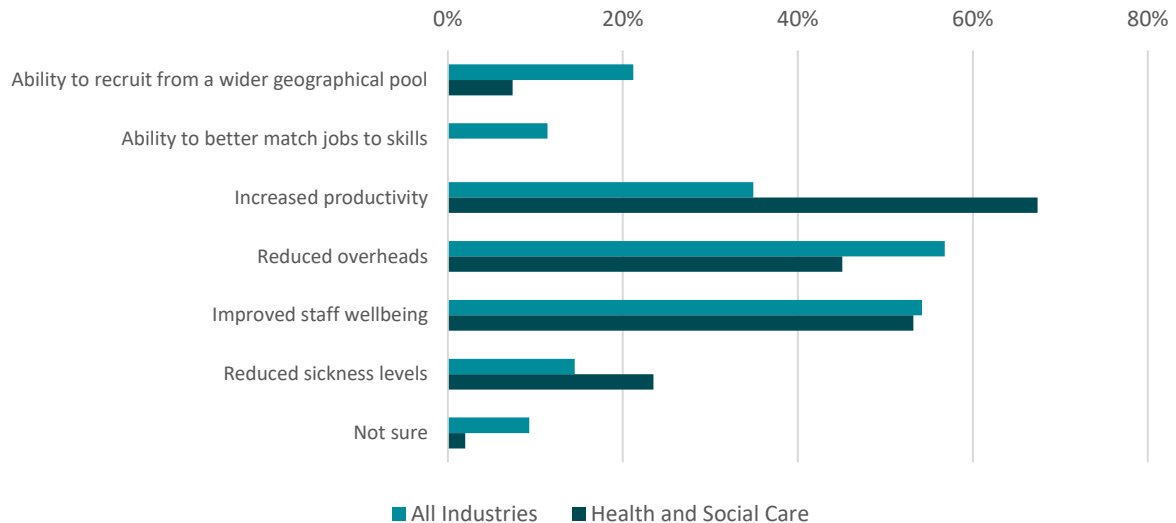
The health and social care sector show lower rates of remote work than the overall industry, although the trends are similar. The highest proportion of health and social care employees working remotely in the time series is 26%, a figure one third the size of the 78% peak in remote work in the education sector data. This demonstrates the way in which Covid-19 has had a distinct impact in the health sector as opposed to other sectors of the UK economy. The nature of a pandemic means that while the GVA contribution of the sector fell in 2020, the demands on the sector have increased. As such it has been essential for health and social care workers to continue their face-to-face work.

According to BICS survey data from the middle of December 2020, the majority of businesses (57%) in the health sector found an increase in homeworking to have no impact on their productivity.²⁵ However, more businesses in the sector noted an increase in productivity (19%) than a decrease (16%). Only one other sector surveyed had a higher percentage of businesses reporting an increase of homeworking boosting productivity.²⁶

The success of homeworking in boosting worker productivity is further evidenced by the fact that 67% of health and social care businesses who will pursue increased homeworking going forward did so due to increased productivity, compared to only 35% of UK businesses (see Figure 3).

It follows that while the sector has experienced limited exposure to homeworking, the success of the remote work that has been possible is likely to have strong lasting effects in the sector.

Figure 3: Reasons to use increased homeworking as a permanent business model going forward



Source: BICS and Cebr analysis

²⁵ In this context, perceived impacts on productivity are interpreted by the respondent of the survey. This interpretation may differ to alternative interpretations of productivity.

²⁶ Arts, Entertainment and Recreation sector: 25% of businesses that have not permanently stopped trading and more staff have been working from home reported that productivity had increased.

