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Adoption and Scalability of Technology Innovation in the Adult Social Care Sector

Rapid Research Review

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1 Introduction.

Digital technology has the potential to play a vital role in the delivery of adult social care. It improves the quality and efficiency of care and supports individuals to remain independent and benefit from improved health and wellbeing outcomes.

Many councils and care providers are already heavily engaged in this agenda, and the pandemic has acted as a catalyst in accelerating both the uptake and scalability of digital technology across the sector. NHSX believes that it is now timely to learn lessons so as to sustain this momentum whilst also seeking to address barriers to further adoption and expansion of the use of digital technology on a wider scale.

NHSX has commissioned Ipsos MORI in partnership with the Institute of Public Care (IPC) at Oxford Brookes University to undertake a review of digital technology across the sector. The Institute has undertaken this rapid research review to identify both progress and barriers to digital technology adoption and scalability across the adult social care sector to summarise existing knowledge and to help scope other aspects of the review. It summarises:

- The current use and effectiveness of digital technology in the sector.
- The potential for digital technology in the sector.
- The barriers to adopting digital technology by care providers.
- The barriers to providing digital technology to the sector by technology suppliers.

2 Use and effectiveness of digital technology in the sector

2.1 Current use of digital technology in the adult social care sector

The last two decades have seen a rapid expansion in the development and application of digital technologies across social care and more recently, as a response to the Covid-19 pandemic, this expansion has increased in both pace and scale.

Digital technology covers a range of differing applications and approaches and different people describe or categorise them in different ways. Within the context of social care there are three broad categories, albeit overlapping, that are generally recognised as defining this range and complexity:

1. Technology enabled care (TEC), sometimes called assistive technology, examples include alarms, sensors and wearable devices.
2. Digital care applications, examples include rostering software, digital care management systems and electronic medication administration records (eMAR).

3. Consumer or mainstream technology, examples include smartphones, tablets, smart watches, smart speakers/virtual assistants, and virtual reality applications.

2.1.1 Technology enabled care

Technology enabled care (TEC) refers to digital technology that seeks to improve people's ability to self-manage their health and wellbeing, alert professionals to changes in their condition and support medication adherence, and as noted in the Sustainable Care Paper 2, TEC has become:

> … an increasingly core, albeit locally highly variable, component of the social care landscape in the UK, and is playing a notable role in reconfiguring important aspects of social and health care systems, particularly in the wake of Covid (Wright 2020, p. 4).

Historically, technology in social care was referred to as 'telecare'; more recently the term technology enabled care services is increasingly used to reflect the blurring of boundaries between telecare, telehealth, and telemedicine devices (Hamblin, 2020a).

Telehealth refers to the remote monitoring of people with chronic conditions to enable a greater degree of self-management. Telemedicine similarly refers to the use of technology to deliver healthcare services, including diagnosis, consultation and treatment, as well as the transfer of medical data – as in, for example, a remote GP appointment. Telecare and Telehealth devices are diverse and include various kinds of static and mobile alarms, self-monitoring devices and environmental sensors, as well as self-care apps.

Telecare is well established within the social care and housing sectors. The terms 'first, second and third generation telecare' are often used. A first generation of relatively cheap, reliable personal alarm and monitoring and response services, whereby a user can press an alarm button or pull a cord to call for emergency assistance. A second generation of devices include continuous environmental monitoring equipment with sensors that use algorithms to raise an alarm if an emergency is detected. Third generation devices include teleconferencing that help create a 'virtual neighbourhood' to combat loneliness and forgetfulness and provide personal care, as well as more complex sensors that could diagnose medical conditions, predict falls and remind people to take medicine.

Digital technology is advancing rapidly beyond traditional telecare to e.g. biomedical support, mobility and rehabilitation devices. For example, lifting or exoskeleton robots, presence or voice operated doors or curtains, and robotic walkers. Whilst such applications are still very much evolving, some parts of the sector have already embraced this type of technology, such as in Hampshire, where robotic technology has been applied to support individuals to remain independent in their own homes (Computer Weekly, 2019).

2.1.2 Digital care applications

This relates to the creation, collection, storage, analysis and sharing of data and information. In the context of social care, this means using digital technology to support how care services are delivered and managed, such as using rostering software, digital

care management systems, electronic medication administration records (eMAR), electronic call monitoring systems, and the use of analytics and artificial intelligence to analyse this data to predict and care demand and improve service delivery.

Current advice from the Care Software Providers Association (CASPA) on digital adoption is to get a clear understanding of how any potential technology product is designed and ensure that it is secure and resilient. They advise choosing intuitive, user friendly cloud-based systems that deal with loss of wifi connectivity well, can be used on a wide range of devices, including older models, and are 'future proof' e.g. can integrate with other products.

Digital care applications also include online platforms used to organise care labour or deliver information about social care, such as Supercarers, Elder, TrustonTap and My Home Touch, that connect people with care and support needs with care workers.

2.1.3 Consumer or mainstream technology:

In parallel with the application of TEC and digital care apps, the sector has also more recently begun to embrace rapidly evolving consumer technology as a means to empower individuals to remain independent (and resilient) in their own homes. Consumer or mainstream technologies being deployed in social care contexts include:

- smart speakers or virtual assistants such as Amazon Alexa and Google Assistant;
- smartphones, tablets or other computers with video conferencing apps such as Zoom, Skype or FaceTime to enable video calls with friends or family members;
- websites or apps for reminiscence or other types of therapy, "brain training" exercises, and entertainment; and
- virtual reality and other interactive tools.

Mainstream technologies, such as voice-activated devices and internet of things (IoT) solutions (e.g. Centrica's Hive), are becoming attractive to the sector as a way of delivering some services as they are accessible and affordable to the public (TSA 2017).

2.2 Deployment of digital technology across adult social care sector

The spread of digital technology innovation and application across the sector is difficult to accurately gauge, particularly amongst independent care providers, and local authority departments are not legally required to provide technology as part of social care arrangements. There are currently no national frameworks or requirements that capture the exact scale and range of deployment, but rather there is a series of reports and articles that provide an indication of both the spread and the maturity of how technology is applied across parts of the social care sector.

Technology enabled care is usually used as part of a 'package' of care along with monitoring and/or responder services. The TEC Services Association (TSA) in their Insight Report, July 2020, notes that there are approximately 1.7million vulnerable people who are connected to alarm and monitoring services (the main bulk of TEC) and that:

- There are over 175 Alarm Receiving Centres (ARCs), which provide a 'round the clock' monitoring service that monitor alarms and other sensors in people's homes.
- 85% of ARCs are owned by councils or housing associations and 15% are privately owned, but these privately owned centres deliver services to 47% of all alarm users.
- 25% of alarm services are paid for privately.
- There are more than 150 responder organisations which employ around 5,000 call handlers and installers. Responder organisations can be contacted by the ARC in the event of an emergency during the day or night to go to the person's home.

All care providers use information technology to some degree – even if it is just the use of a single computer for sending and receiving emails – and digital care systems / applications are increasingly being used by regulated care providers to run their businesses. The Institute of Public Care discovery programme (2019) estimated that a third of care providers relied on digital care systems, a third used a mix of paper based and digital applications to manage and organise their services, and the remaining third relied upon paper based systems. Larger regional or national organisations are more likely to make greater use of digital care systems and this is particularly the case for care homes who do not have the challenge of community-based care staff using mobile devices to access digital systems.

A number of providers and councils have begun to trial the use of mainstream or consumer technologies such as Amazon's Alexa to support the health and wellbeing of vulnerable people. Examples include developing Alexa functions or skills to provide reminders to take medication and help record and manage care tasks completed by caregivers. The size and spread of the use of smart consumer technology in social care contexts is not known.

As part of the response to the pandemic, the social care sector has been supported by central (and local) government to accelerate its use of digital technology. These activities provide some further insight as to the extent of deployment of digital technology, although it is recognised that this is only a partial perspective. Examples include:

- NHSX provided over 10,000 portal devices (tablets) to help those in social care settings connect with family and friends through video calls when visiting was restricted during lockdown.
- A Socitm survey in June 2020 completed by over 2,500 staff from over 90 councils suggests that approximately 82%have been able to work from home - up from 5% before the first lockdown.
- Microsoft Teams was made available to NHS and social care organisations for free in March 2020 (for a limited time period) to counter the increased risks associated with the pandemic. On 9th December 2020, there were 232,901 active users – compared with 60,937 active users on 31st March 2020 (NHS Digital 2020). The number of care providers using NHSmail also rapidly increased. However, analysis by the Institute of Public Care (2020a) suggests that only a maximum of two thirds of social care providers can be using their NHSmail accounts.

Another means of understanding deployment of digital technology within social care is to consider the level of digital maturity within local systems. The Local Government

Association (LGA) undertook an exercise across councils to gauge their level of digital maturity to mirror a similar digital maturity assessment undertaken within the NHS. The LGA assessments were undertaken in 2016 and 2017. The assessment undertaken in 2017 involved 103 councils completing a self-assessment (68% of all 152 councils) covering themes of digital readiness, capabilities and infrastructure. The assessment noted:

- Around 80% of all councils had planned significant investment in digital technology programmes linked to social care - with the largest number focusing on mobile working solutions for workers.
- Many councils had plans to improve their online offer and nearly all local councils provided up to date online information and advice relating to meeting social care needs, including links to local information.
- Only 15% of councils were using apps in social care.
- Nearly all councils offered the traditional alarm based telecare, with a high proportion also commissioning proactive sensor based equipment. Most councils were actively promoting remote and assistive technology to a wide range of citizens, including self-funders and those not yet in need of care.

2.3 Effectiveness of digital technology in the adult social care sector

Digital technology has repeatedly been presented as a solution to a combination of long-standing challenges facing health and social care systems in terms of responding to budget pressures, rising demographic demand, and workforce shortages - whilst seeking to ensure improved outcomes and quality of service delivery.

As early as 2004, the Audit Commission noted new digital technologies offer '...the tantalising possibility for public policy to meet more people's desire to remain independent for longer, while at the same time saving money overall' (Audit Commission 2004, p. 42). This opportunity was also reflected in the government paper Personalised Health and Care 2020, which in 2014 noted:

> One of the greatest opportunities of the 21st century is the potential to safely harness the power of the technology revolution, which has transformed our society, to meet the challenges of improving health and providing better, safer, sustainable care for all (HM Government 2014, p. 7).

Further, there was considerable early optimism about the specific potential impact of TEC upon social care services. The Department of Health (2005) in Building Telecare in England suggested that up to 35% of the 500,000 older people living in care homes at the time could be supported to live at home or in extra housing schemes by using telecare, whilst the Scottish Joint Improvement Team (2008) predicted that it could reduce admissions of older people to residential care by up to 25% over 20 years.

There are many examples of documented benefits accruing from the adoption and scalability of digital technology. However, there is no standardized methodology or metrics to present benefits in a consistent way that facilitates comparison across and within services. The Kings Fund in 2018 noted that capturing benefits is complex:

> Finding conclusive evidence of the benefits is difficult. Things are complicated by the fact that some studies may be evaluating an imperfect implementation, while others may be highlighting a problem with the technology itself. Technology is also being adapted and changed constantly and so the solution and its use within an organisation at the start of an evaluation can potentially be very different at the end of it (Kings Fund 2018, p. 12).

Despite the inconsistencies in capturing benefits, there are numerous case studies published by leading organisations within the social care sector, such as TSA[1], Care Quality Commission (CQC)[2] Digital Social Care[3] and LGA[4] for example. However, whilst all case studies are helpful in profiling the potential benefits of digital technology towards realising a range of improved outcomes, quality, productivity or financial return, they all remain widely different in scale, setting, maturity and type.

Whilst many of the papers and articles considered in this rapid evidence review connect the adoption and scalability of digital technology with the ambition to meet the significant financial pressures faced by the adult social care sector, there is at the same time little evidence presented of financial return or improved productivity set within a national sector wide context. The LGA, Institute of Public Care and Association of Directors of Adult Social Services (ADASS) report on digital innovation notes 'Though [there is] some evidence of the financial benefits from investment in digital approaches, there is stronger evidence about improved outcomes for people (LGA, Institute of Public Care and ADASS 2020, p. 4):

Whilst many of the research and policy papers reference evidence of financial efficiency and effectiveness, it was noted that the more independent bodies did not present evidence of efficiencies or effectiveness scaled up to a sector wide scale. There are however a number of case studies that are often referenced as indicative of the potential financial and productivity benefit of digital technology application in adult social care. These include:

- **Tunstall Healthcare Group** published a research paper in 2020 which reported that by the use of telecare across Lancashire County Council £4,500 per person per annum was avoided in home care and other social care costs when reactive telecare was included as part of the care services. Based on the 6,000 service user numbers at the time this equated to £13.3 million per annum.
- In 2018 an LGA case study reported that **Hampshire County Council** had worked in close partnership with a tech company over a period of four years in introducing TEC as part of its mainstream social care offer. At the time of the report, over 9,000 people were benefiting from TEC. Feedback from clients noted that 94% reported increased feelings of safety and security and in addition to the improved quality of life, the partnership saved the council over £7 million in terms of reduced reliance on non-personal domiciliary care and delayed admission to residential settings.
- **Social Care Institute for Excellent (SCIE)** recently supervised a national evaluation of the PASSsystem used by over 700 independent care providers. The

[1] TSA Case Studies https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2020/uk-internet-use-surges
[2] CQC Case Studies https://www.cqc.org.uk/publications/themed-work/driving-improvement-through-technology#about
[3] Digital Social Care-Success Stories https://www.digitalsocialcare.co.uk/success-stories/
[4] LGA Case Studies https://www.local.gov.uk/case-studies

evaluation noted, that alongside perceived improvements in the quality of care, that providers were reporting improved efficiency in the delivery of care.

- Success stories reported on **Digital Social Care** give examples of care providers' use of digital technology, including many examples of providers adopting digital care management systems. Reported benefits are usually improved accuracy, timeliness and more detailed record keeping, which leads to saving staff time and often better handovers of care between staff and better risk management or fewer adverse incidents. An example is Jewish Care introducing electronic care planning software in its eleven care homes or the Keyfort Group moving to an online care management system, which is saving them time, increasing accuracy and helping communication.

Whilst productivity and financial returns is considered an important element in establishing the business case for wider adoption and scalability of digital technology, many papers and articles set out the case that, rather, it is improved outcomes and quality that has underpinned the drive towards the uptake of digital technology across the sector. Action research conducted by the Institute of Public Care (2020a) concluded that the adoption of digital technology as a result of the pandemic did bring benefits:

- Access to NHSmail improved providers' communication with NHS organisations and therefore supports better coordination of care around the person's needs and speedier or easier admission of people into the service.
- Use of digital rostering, care planning and visit logging systems was viewed as reducing administrative effort by care providers.
- Adoption of video conferencing was seen as a significant benefit, if not a necessity, by providers during the pandemic, also leading to better infection control by minimising contact with other professionals.

This rapid evidence review has identified a series of statements from leading social care organisations setting out the perceived benefits of digital technology from the perspective of improved outcomes for individuals and whilst the review has not highlighted a standardized methodology to capture and measure these benefits, the statements are relatively similar and consistent.

In 2008, the Social Care Institute for Excellence (SCIE) published a research paper reviewing assistive technology and older people which listed the following perceived improved outcomes:

- Increased choice, safety, independence and sense of control.
- Improved quality of life.
- Maintenance of ability to remain at home
- Reduced burden placed on carers.
- Improved support for people with long-term health conditions.
- Reduced accidents and falls in the home.

More recently, the Care Quality Commission (CQC) has produced an online resource for commissioners and independent care providers setting out how digital technology can support high quality care. This guide sets out a series of statements listing

perceived improved outcomes from the perspective of the regulator of quality within the social care sector:

- Give people more control over their health, safety and wellbeing.
- Support them to be more independent or feel less isolated.
- Link them to services which are important for them.
- Enhance the care or treatment providers offer.
- Help them communicate with families, professionals and staff.
- Help staff to prioritise and focus their attention on people who need it most.
- Capture and compare data and share good practice with peers.

3 The potential for digital technology in the sector

The Department of Health and Social Care (DHSC) sets out a clear message about the potential of digital technology in the opening section of its policy paper The Future of Healthcare:

> Our ambition should be for the use of the best technology available for the NHS and social care sector. The potential of cutting-edge technologies to support preventative, predictive and personalised care is huge (DHSC 2018).

This potential to some extent has begun to be realised as a consequence of the health and care sector's response to the pandemic. The government has recently issued a White Paper that in its executive summary commits to:

> The response to COVID-19 – led by those who know best – has shown us new ways to deliver care using innovative and creative solutions, exploiting the potential of digital and data, instead of needless bureaucracy. We must not go back to the old ways of working. The gains made through these new approaches must be locked in (DHSC 2021, p9).

The potential opportunity of digital technology is also shared by ADASS. In its 2019 Budget Survey 96% of Directors of Adult Social Care saw the use of assistive and communications technology as 'quite or very important for making financial savings', and in a published roundtable discussion between ADASS executive members and policy leads in 2019, it was noted that 'technology offers multiple potential benefits in adult social care including enhanced communication, freed up workforce capacity and more reliable advice' (ADASS 2019, p. 3).

In July 2020, ADASS published its Nine Statements to Help Shape Social Care Reform which included a statement highlighting the significance of wider adoption and scalability of digital technology. Statement seven and places digital technology at the centre of a future transformed adult social care sector 'we must prioritise access to technological and digital solutions'.

Whilst it is noted that commissioners, care providers and policy are increasingly embracing digital technology, the momentum towards greater adoption and scalability of technology solutions is also driven by people with care and support needs, and particularly in the context of their use of rapidly evolving consumer technology.

A report by Appello (2018) identified that older people are willing to embrace (consumer) technologies provided they are easy to use and can improve their wellbeing. Appello surveyed older people who said they welcome new technology if it improves their quality of life; over half (56%) agree that 'technology can aid communication and help close the physical gap between distant family and friends.'

Recent analysis by the Kings Fund (2020) summarised the potential of rapidly evolving smart consumer based digital technology within a health and care context, building upon the momentum of adoption and scalability as experienced across the sector during the pandemic lockdowns. The analysis identified the following smart technology and approaches as offering new potential to the sector in terms of securing improved outcomes, efficiency and service quality:

- **Smartphones:** these consumer technologies have been subject to almost exponential levels of evolution and rates of accessibility. Almost 80% of the population has a smartphone, yet the Kings Fund comments that the full potential of smartphone technology to create and monitor personalised digital biomarkers to improve prevention, treatment and help people make sustained behaviour change is still to be realized across the health and care sector.
- **Wearable devices:** these consumer technologies are more recent developments coming onto the market and include for example smartwatches (e.g. an Apple Watch), activity trackers (e.g. a Fitbit) and connected patches (e.g. a smart bandage or smart plaster). These are generally in direct contact with the wearer for long durations, generating large quantities of data on specific biometrics or behaviours. There is potential for these devices to be widely used in health and care, as well as by individuals to improve their health and care.
- **Smart homes:** more recent technology advances have seen the rapid evolution of smart homes across the sector. Smart homes combine networked sets of home devices (sensors, appliances and heating/cooling) under digital control as well as personal devices such as smart watches, voice controlled virtual assistants and wearable fitness monitoring devices.
- **Apps:** this is a rapidly evolving consumer market, encompassing everything from sleep diaries and mindfulness guidance to period trackers and healthy eating support. However, the uptake by the health and care system has been patchy due to a range of issues including the generally limited evidence-based analysis as to the full benefit of such a range of commercially available apps.
- **Digital therapeutics and immersive technologies**: digital therapeutics are evidence-based health or social care interventions delivered either entirely or mostly through a device. For example, a clinician could prescribe a person with a history of depression or anxiety an app that incorporates, for example, breathing exercises, meditation or cognitive behavioural therapy (CBT). Virtual-reality technologies have been on the cusp of widespread consumer adoption for many years but have yet to be realised despite significant advances in the technology. It has potential to be applied to several areas such as pain management and rehabilitation.
- **Robotics and automation:** robotic technology has rapidly involved and has significant potential for wider application within a health and care setting. A recent article in The Guardian (7 September 2020) reported that care homes are now beginning to use robotics to reduce loneliness and improve mental health amongst residents. The article noted that research being supported by the University of

Bedfordshire had concluded that in trials across the UK and Japan 'older adults in care homes who interacted with the robots for up to 18 hours across two weeks had a significant improvement in their mental health. There was a small but positive impact on loneliness severity among users.'

- **The connected community:** the pandemic has opened up a new world of virtual connectedness and community, including peer to per support networks. The government has recognised this potential of technology and launched the TechForce19 Challenge in April 2020 to fund up to 18 projects to test out new innovative technologies to keep vulnerable people, such as those who rely upon adult social care, to be connected.

The potential of smart consumer technology is not just restricted to the context of supporting improved health and wellbeing of individuals but can also be applied within the context of how care services are delivered and managed.

In a paper by Professor John Bolton for the Institute of Public Care (2020b), it is noted that care providers have already begun to explore the use of smarter digital technology to replace the human interaction with the individual as a means to manage costs – for example replacing a domiciliary care check-up visit with smart technology, such as sensors, permitted CCTV and remote communication devices.

In terms of the commissioning of care, consumer-based technologies have been adapted to support individuals purchase their own personalised care through such online platforms as Supercarers, Elder, My Home Touch, and Nesta's TrustonTap project. These approaches are often referred to as "disruptive" technologies in that they offer individuals new ways to access potential sources of support or mechanisms to coproduce their care support arrangements with others, rather than opting for more traditional care management route.

Digital technology has been heralded by government as a key component of a transformed, integrated health and care system. This vision has been articulated in detail within the NHS Long Term Plan, which noted that 'In ten years' time, we expect the existing model of care to look markedly different. The NHS will offer a 'digital first' option for most' (NHS 2019, p.92) and was reiterated in the White Paper (DHSC 2021).

4 Barriers to adopting digital technology

The literature identifies a range of separate and connected issues that can inhibit the extent of digital technology adoption and scalability. These barriers will differ between teams, organisations or even localities, but there is a narrative of either shared experience and perception of barriers which exists, and to which can be used to describe the challenges faced by the sector.

An unpublished report by Digital Social Care and Skills for Care (Digital Readiness Evaluation Report 2019) referenced by the Institute of Public Care (2020a), sets out a series of barriers to digital adoption identified by a representative sample of 501 social care organisations in England. This list of barriers has been simplified for the sake of this review into four common themes:

1. Lack of **resource** to invest in appropriate technology or **capacity** to upskill staff.

2. Lack of **leadership** from employers and managers or skills to make decisions on best systems for their organisation.
3. **Workforce** resistance to using digital technology or staff not having the skills needed to use digital technology.
4. **Infrastructure and operational** issues such as internet connectivity problems, lack of confidence in the reliability and/or security of digital, or issues with interoperability.

4.1 Resources and capacity

Adult social care faces ongoing financial pressure that impact the pay levels of the workforce and threaten the sustainability of the care market. In November 2020, LGA calculated that adult social care faces cost pressures of £4.8 billion in 2021/22, including £533m pressures arising just from Covid-19, which will continue into 2021/22. Pressures within council budgets spill out into the budgets of independent care providers, many of whom are reliant upon council funding. Ongoing financial pressures have acted as a significant barrier to investing in digital technology, particularly over the longer term (Local Government Association, Institute of Public Care and Association of Directors of Adult Social Services, 2020). Lack of resource to invest in appropriate technology was cited as a barrier to digital adoption by half of care providers (and time and costs to invest in upskilling staff by a third) in a survey by Digital Social Care and Skills for Care (2019).

In light of the considerable pressures facing both commissioners and providers of social care, there is a particular onus on securing efficiency and effectiveness of service delivery to ensure budget targets are met. However, there is a limited evidence base and methodology to set out a convincing business case for investment in digital. This is exacerbated by short term investment. The sector operates in a precarious financial environment, characterised by short term financial imperatives and spending review periods. This impacts upon the sector's ability and capacity to take a more strategic approach to digital technology innovation.

New digital technologies tend to be subject to isolated, small-scale pilots or developed outside of mainstream social care practice, leading to difficulties in scaling up and adoption across other parts of the system. In adult social care, as many providers are small organisations, there is often a lack dedicated resources for digital technology investment.

The Kings Fund (2018) described a 'productivity paradox' which hinders the wider adoption of digital technology. This refers to the phenomenon of an absence of efficiency gains accompanying widespread digitisation, at least as we measure them with traditional indicators.

4.2 Leadership

The call for leadership in supporting and encouraging digital adoption and scalability was a common feature in much of the literature. For example, 'Digital transformation requires strong leadership and an organisational culture that encourages innovation' (Local Government Association, Institute of Public Care and Association of Directors of Adult Social Services, 2020, p. 18).

The Kings Fund (2018) noted that effective leadership should look beyond immediate (financial) imperatives, and as well as being skilled and informed about the innovative use of technology, leaders should take a more long-term pragmatic approach.

Digital transformation works best when embedded in a wider network of support, training and awareness. The digital maturity of a care provider is influenced by the digital literacy and leadership of its leaders and owners, ensuring digital leadership within the care provider sector is as important as improving the skills of frontline workers and improving connectivity (Institute of Public Care 2020a). Lack of skills by care provider organisations to make decisions on the best systems for their organisation was cited as a barrier to digital adoption by nearly one in five respondents to a survey by Digital Social Care and Skills for Care (2019). Skills for Care (2014) reported that the two most significant determinants for whether organisations were embracing digital technologies appeared to be management priorities and the overall attitude to change in the organisation.

4.3 Workforce

Whilst leadership is important to advancing the adoption and scalability of digital technology across the adult social care sector, organisations also need to promote workforce culture and competency in engaging with digital technology. Education and development of the whole workforce was a key recommendation of the Topol Review which noted that 'digital literacy … requires the development of the skills, attitudes and behaviours that individuals require to become digitally competent and confident' (NHS Health Education England, 2019, p. 11) and that the workforce's awareness of the required capability, access to training and support, and skills to enable patients and citizens to improve health and wellbeing through technology will all need to be improved, as a fundamental shift in the balance of skills in the workforce takes place over the next two decades.

Digital skills and in particular staff confidence in adopting digital solutions more broadly was often identified as a barrier as this is as much about culture change as equipping people with specific digital skills (Institute of Public Care 2020a). Interestingly, research by Skills for Care (2014) highlighted differing attitudes to using digital technology. Staff have confidence in their own basic online skills with over 90% feeling confident or very confident, but 52% of managers feel staff do not have sufficient basic online skills.

Staff skills are part of the 'digital divide', or inequality of access to the internet because of both infrastructural differences (see 4.4 below) and people's characteristics. The number of adults who are 'internet non-users' has been declining over recent years, but in 2018 there were still 5.3 million adults in the UK, or 10% of the adult population, in this situation (ONS, 2019). The Tech Partnership Basic Digital Skills framework[5] describes five basic digital skills that can be used to measure digital inclusion and the activities someone should be able to do to demonstrate each skill. These are:

- **managing information**: using a search engine to look for information, finding a website visited before or downloading or saving a photo found online.

[5] This has now been replaced by the Essential Digital Skills framework

- **communicating**: sending a personal message via email or online messaging service or carefully making comments and sharing information online.
- **transacting**: buying things online or buying and installing apps on a device.
- **problem solving**: verifying sources of information online or solving a problem with a device or digital service using online help.
- **creating**: completing online application forms including personal details or creating something new from existing online images, music or video.

To be considered to have a digital skill, respondents need to be able to do one of the activities listed under it. The Lloyds Bank UK Consumer Index 2018 uses this framework to estimate the digital skills of the UK population. It estimates that the number of people in the UK lacking basic digital skills is declining, but pre-pandemic 8% of people in the UK (4.3 million people) were estimated to have zero basic digital skills (are unable to do any of the activities described in the five basic digital skills) and 12% (6.4 million adults) were estimated to only have limited abilities online (missing at least one of the basic digital skills). However, as reported by Ofcom:

> The pandemic appears to have accelerated the adoption of online services to keep in touch with friends and family. More than seven in 10 online adults in the UK are now making video calls at least weekly, up from 35% pre-lockdown. This trend is particularly noticeable among older internet users; the proportion of online adults aged 65+ who make a least one video-call each week increased from 22% in February 2020 to 61% by May 2020' (Ofcom 2020).

Good Things Foundation identified that 7million people in the UK do not have internet access at home and 9 million people cannot use the internet without help 'being unemployed, retired, disabled, living on a low income, no or few qualifications: these are the biggest predictors of being on the wrong side of the digital divide' (Good Things Foundation 2020, p. 4).

4.4 Infrastructure and operational issues

Digital technology requires broadband or 3/4/5G infrastructures to function securely and reliably. As Skills for Care found in 2014, lack of consistent internet access for mobile workers providing services in people's homes inhibits the use of digital technologies directly with people who receive care and support services at home. Rural-urban differences in the quality of broadband, and 4G and 5G connectivity, has led to "unacceptable inequalities", with some groups excluded from TEC (TSA, 2017, p15). Levels of internet access in the UK have been rising steadily – in 2019, about 90% of households had access (ONS, 2019) - but access to and use of the internet varies geographically.

However, there are a number of national programmes supporting greater digital inclusivity. For example, NHSX has worked with internet providers to offer internet connection deals[6], and the LGA[7] has been supporting digital connectivity (both mobile and broadband) within council areas to help residents and the workforce to interact with the councils in smarter, easier and more innovative ways.

[6] https://www.nhsx.nhs.uk/covid-19-response/social-care/internet-connection-deals-care-homes/
[7] https://www.local.gov.uk/lga-digital-connectivity-programme-prospectus

Lack of information sharing and digital interoperability continue to be seen as key barriers to innovation. Care and mainstream apps for mobile devices have gained prominence as a technology that can be relatively quick and inexpensive to develop, make use of existing hardware infrastructure, are very scalable and relatively interoperable across different consumer devices.

There is an emerging risk of older systems becoming obsolete, leading to inconsistency in the extent of TEC deployment across differing services - with the majority of first and second generation (analogue) devices not configured to function after the planned digital switchover scheduled for 2025. Analysis undertaken by TSA (2020) identified that older Alarm Receiving Centres, particularly those with fixed-line, analogue communications or older platforms (as employed by over 60% of services) have found it difficult to switch to alternative working models.

An operational issue that is often anecdotally reported as a barrier to digital adoption has been demands by commissioning and regulatory organisations that independent care providers retain some form of paper records and do not go paperless. Care Quality Commission inspection practice, or independent care providers' perception of that practice, is a barrier to greater use of digital in the sector (Institute of Public Care, 2019).

Issues of data governance, including privacy and data security, is also cited as a barrier to wider adoption of new technologies. The combination of greater integration between services and the uptake of digital care applications has resulted in increased volumes of personal data being shared across and within organisations and the potential of increased risk to the security of this data. These risks can act as a barrier to further adoption and scalability of digital technology across the system, particularly amongst services that lack technical expertise and capacity to manage and mitigate such risks. There are further worries about privacy and data security awareness related to the uptake of mainstream technologies such as smart speakers in social care settings.

5 Barriers to supplying digital technology

Technology providers (of software and hardware) are a key partner to the wider adoption and scalability of digital innovation across the sector. The TSA has called for much earlier engagement and sustained cooperation with technology providers in designing and implementing proactive solutions or "service wrap" to enable smarter outreach and targeted support for vulnerable individuals. This view has also been echoed by commissioners, who note:

> 'Digital transformation isn't enabled by any one piece of kit or technology, but by local, regional and national collaboration. The progress we have seen … is underpinned by strong, and in most cases long-term, partnerships' (LGA, Institute of Public Care and ADASS 2020, p. 18).

TSA maintains that technology providers offer ingenuity and tenacity in designing and implementing solutions 'we need to lift the TEC sector out of its historic silo and ensure it is fully embedded and integrated within mainstream health and care services' (TSA 2020, p. 13). Whilst the Kings Fund (2018) identify that successful digital transformation within the sector is determined by treating such activity as change projects and not IT

projects, and commissioners report that technology providers often present solutions that are purely technical rather than considering the wider model of care.

On the flip side of closer and earlier collaboration and taking a project management approach to the development of digital technology solutions, research undertaken by Deloitte (2019) noted that technology providers experienced lengthy commissioning and procurement processes within the sector, slowing down innovation and adoption.

One innovation that aims to overcome some of these procurement issues is the Social Care Digital Accelerator Programme (SCDIA), which is funded by NHS Digital and managed by the LGA. The programme uses match funding to bring together councils, partner agencies, and technology suppliers to co-fund and collaborate on digital innovations that have the potential to be sustainable i.e. to deliver commercially viable solutions that will scale across the adult social care sector.

In the context of much closer and earlier engagement with technology providers a study by Greenhalgh et al (2008) found that 'bridge' professionals (people who hold boundary-spanning roles) can act as translators between the barriers of different professional 'worlds' – for example, social workers and the technical – and can make digital implementation more likely to be successful. TSA go further and identify that technology providers experience barriers due to a lack of technical awareness by both commissioners and independent care providers.

The vast choice of software and hardware can itself present a barrier in how technology providers engage and work with social care. The technology sector is one of the fastest growing parts of the national economy. The latest Tech Nation Report notes that in 2019 over £10.1billion was invested into UK tech and there has been significant investment in a range of smart technologies covering, for example, artificial intelligence, robotics, cybersecurity, internet of things, virtual reality and augmented reality. Consequently, there are a myriad of technology solutions coming onto the market both at an increasing rate and range of diversity. Not only is there more choice and increasing use of consumer technology within social care, many of these technologies have a relatively short shelf life, which is itself a barrier to the longer-term perspective of social care provision and commissioning.

TSA research on the contribution of TEC to the response to the pandemic has called for greater clarity in showcasing selective 'proactive TEC interventions which have shown the greatest impact on health and care outcomes and use these to fast-track specifications and plans for service delivery', as well as calling for 'guidance on new service models and a spectrum of enabling technology' (TSA 2020, p15).

National organisations such as NHS Digital have published a directory of apps which have been subject to a verification process, and the Care Software Providers Association (CASPA) have produced a best practice guide to support organisations to implement the right technology solution. However, the TSA is calling for even more detailed guidance, standards, quality assurance frameworks and support to dismantle the existing barriers of 'unstable' systems (including back-office data and management systems) not working together and the need take a more sustained and integrated approach to digital transformation.

6 Conclusion

Digital technology covers a range of differing innovations that can be categorised as:

- Technology enabled care (TEC), sometimes called assistive technology, examples include alarms, sensors and wearable devices.
- Digital care applications, examples include rostering software, electronic care management systems and electronic medication administration records (eMAR).
- Consumer or mainstream technology, examples include smartphones, tablets, smart watches, smart speakers/virtual assistants, and virtual reality applications

The spread of digital across the sector is difficult to accurately gauge. Although we can say that first generation telecare is well established within the social care and housing sectors care, and that about two thirds of care providers used digital care applications to run their businesses pre-pandemic.

There has been a rapid expansion in the use of digital technologies across social care as a response to the Covid-19 pandemic and the shift to digital (as opposed to analogue) and mainstream technologies is increasing.

Barriers to the adoption and scalability of technology fall into four common themes:

1. Lack of resource to invest in appropriate technology or capacity to upskill staff.
2. Lack of leadership from employers and managers or skills to make decisions on best systems for their organisation.
3. Workforce resistance to using digital technology or staff not having the skills needed to use digital technology.
4. Infrastructure and operational issues such as internet connectivity problems, lack of confidence in the reliability and/or security of digital, or issues with interoperability.

Whilst there are many examples of documented benefits accruing from digital technology, there is no standardized methodology to present benefits in a consistent way that facilitates comparison across and within services – particularly evidence of the financial benefits from investment in digital.

Technology has repeatedly been presented as a solution to challenges facing health and social care systems in the UK. Supporters argue that innovation can help solve the urgent problems facing the sector: reducing the cost of care by enabling people to live in their own homes for longer; providing remote services and tools for self-care and management of chronic health conditions; enabling closer integration of health and social care; and providing more personalised and preventive care services. The potential opportunity of digital technology is shared by government, commentators and representative bodies alike, and technology suppliers call for detailed guidance, standards, quality assurance frameworks and support to overcome interoperability issues.

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