The last two decades have seen an explosion in the development and availability of new information and communication technologies (ICTs) across UK social care. Supporters argue that ICT 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, and thus reducing the need for domiciliary care visits; enabling closer integration of health and social care; and providing more personalised and preventive care services through the use of data, algorithms and AI to keep users healthier for longer.

As the Audit Commission stated in their 2004 report ‘Assistive Technology: Independence and Wellbeing’, these new 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”. Sixteen years later, following a decade of austerity, with sustained reductions in social care funding, worsening workforce shortages, and a lack of political leadership on social care from central government, the promise of technologies that might deliver cost savings while improving services remains highly alluring. The COVID-19 pandemic crisis, which has disproportionately affected social care, has further highlighted the potential benefits of technologies to maintain or even improve services while reducing direct person-to-person contact.
This Sustainable Care paper – an output of the Achieving Sustainability In Care Systems: The Potential Of Technology project – presents an overview of the development and implementation of ICT in social care from 2000-2019 through a review of policy documents and grey literature. It focuses on policy and initiatives at the level of England and the national devolved governments of Scotland, Wales and Northern Ireland, as well as at the local authority (LA) / council / trust level (depending on devolved nation). The aim is to provide historical perspective on the current moment, as well as a snapshot of the role that technology is playing in social care right now. The conclusion discusses some of the key obstacles and challenges to the effective and ethical development and use of ICT in social care.

In this paper, we focus on the following three categories of ICT:

1. Digital technologies to deliver, or facilitate the delivery of, social care:
   - Telecare, telehealth and telemedicine. These include sensors, computers, mobile/wearable devices, pendant alarms, smart hubs, and other devices and infrastructure, used to monitor users, generate and analyse data about them, and connect or provide them with care and health services.
   - ICT for social communication and entertainment. This includes mainstream technologies being deployed in social care contexts, such as smartphones, tablets or other computers with software apps such as Zoom, Skype or FaceTime to enable video calls with friends, family members or caregivers; websites or apps for reminiscence or other types of therapy, “brain training” exercises, and entertainment; social robots; virtual reality; and other interactive tools.
   - ICT to provide biomechanical support, mobility, exercise and rehabilitation. For example, lifting or exoskeleton robots, presence- or voice-operated doors or curtains, and robotic walkers.
   - Online platforms used to organise care labour or deliver information about social care. This includes platforms such as Supercarers, Elder, and My Home Touch, that connect care service users and care workers.

2. Digital infrastructure: including the nationwide switchover from analogue to digital telephone lines in 2025, access to broadband, 4G and 5G telecommunication networks, as well as housing modifications such as smart home sensors, environmental controls, CCTV, and electronic locks for safety and accessibility.

3. Data and information: technologies related to the creation, collection, storage, analysis and sharing of data and information relevant to care. This includes the use of data to plan and organise social care, such as integration of health and social care data, the sharing of care data between caregivers, and the use of analytics and artificial intelligence to analyse this data. This overlaps with the other two categories via the generation and analysis of data from smart homes, monitoring systems, digital devices and algorithmic systems used to predict and manage care demand or prevent falls.

UK technology and care policy: Key themes

In the UK, overarching strategy and funding for initiatives such as telecare and telehealth have often come from central government, and have cut across different areas of policy-making. Research and development of new technologies have also been centrally funded by national research bodies such as Innovate UK (formerly the Technology Strategy Board), the National Institute for Health Research, the Engineering and Physical Sciences Research Council, UK Research and Innovation and NHS England, as well as European Commission research programmes. However, decisions about the implementation of specific technologies have been largely devolved to LAs, reflecting their statutory responsibility for the delivery of social care. The combination of a more top-down approach to research and development of new ICT and a more bottom-up approach to its implementation at the local level has led to a disconnect. As a 2013 report 'Can online innovations enhance social care?' by the Nominet Trust (now the Social Tech Trust) notes, new technologies tend to be subject to “isolated, very small-scale pilots or developed outside of mainstream social care practice”, leading to difficulties in scaling up.

The evidence base for many of these new technological devices is underdeveloped – an issue aggravated by the recent proliferation of devices and shorter lifecycles of many generic consumer products that LAs are bringing into care, which tend to make them less amenable to the time commitments required for rigorous, peer-reviewed studies. By the time a device has been rigorously assessed, it may already have been replaced by a newer version. Major exceptions are telecare and telehealth systems, which have been introduced over decades and been the subject of several significant large-scale studies (see section “Telecare, telehealth and telemedicine”
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below). There are also recent signs of a change of approach. NHSX was set up in July 2019 with the intention to "drive digital transformation and lead policy, implementation and change", and the Digital Social Care organisation was established in 2019 to "provide advice and support to the sector on technology and data protection".

One of the main actors in this field is the Technology Enabled Care Services Association (TSA), the main industry body for telecare and telehealth in the UK, which lobbies government on issues of technology in care, operates a quality standards framework certification scheme, and maintains a close relationship with the Association of Directors of Adult Social Services (ADASS). In collaboration with the TSA and TLAP, ADASS has strongly advocated for embracing digital technology through publications such as their 'TEC Stories', arguing that it "gives people greater opportunity to be engaged with a wider community, to make their own decisions, be better informed and be more independent and for social care (and healthcare and housing) in turn to be more individually tailored – personalised". ADASS in its 'New Dialogues' series of think pieces also argues technology is a key way to deal with the labour shortage in the market; as one director of adult social services stated: "Strategically, we must be really clear about the workforce we will not have... In that context you absolutely have to use smart assistants or whatever to create capacity [in] the personal care workforce".

Many directors of adult social services see ICT as crucial in making cost savings. The ADASS Budget Survey 2019 noted that 96% of directors of adult social care saw the use of assistive and communications technology as quite or very important for making financial savings. The proliferation of telecare seems to have been a key means by which councils have maintained their provision of statutory services despite drastic reductions in local government budgets in recent years, which have resulted in LAs in England cutting funding for social care by £7.7bn in real terms between 2010 and 2019. According to a survey of telecare across English LAs in 2016-17, 47% of directors of adult social services saw telecare as a possible substitute for social care, while 97% saw it as a way to delay and reduce the need for care and support (Woolham et al., 2018: 2). Perhaps in response to the success of telecare in facilitating cost reductions, several LAs, often in partnership with other stakeholders including consulting companies, universities, and private consortia such as the PA Argenti partnership, have begun to restructure social services departments, with closer working between CIOs (Chief Information Officers) and adult social care departments, dedicated technology champions, new relationships with private companies, and new "innovation hubs" or units to lead initiatives trialling and implementing emerging tech products.5

This reconfiguring of social care is part of a broader change of mind set in service delivery, as well as a shift in the resources available to social care commissioners accompanying the move towards adoption of telecare over the past 20 years. Most technology has been aimed primarily at extending the length of time that older people can live independently at home (Department of Health & Social Care, 2018). This policy has had profound implications across the care landscape, with a move away from institutional care and towards support in the community, and especially in people’s own homes, assisted by technology. ICT adoption has chimed with the rhetoric of empowerment, personalisation and “co-producing” services with users, carers and corporate “partners”. At the same time, there has been a restructuring of care service provision towards domiciliary care services, and changing roles for caregivers (both unpaid carers and paid care workers). There are now an equal number of residential care workers and domiciliary care workers (presentation by Jane Townson, CEO of the UK Homecare Association, 15th October 2019), and part of the reduction in spending on social care can be attributed to LAs paying close to the minimum wage to domiciliary care providers, some of which have started to hand back contracts that they cannot afford to fulfil. At the same time, as noted by John Bolton in his paper ‘What are the opportunities and threats for further savings in adult social care?, "Some councils have replaced a domiciliary care check-up visit with assistive technology". These shifts should be seen within the changing technological context of care, particularly as more digital platforms are available to connect care workers with care recipients and manage care, creating new arrangements of care labour provision.

The European Union has also ramped up investment in care technologies. Between 2008 and 2013, the EU, its member states and industry invested over €1bn in “Research for Ageing Well”, including €400m in the 7th Research Framework Programme (FP7), and €600m in the Ambient Assisted Living (AAL) Joint Programme, which funded projects aiming to raise the quality of life for older people through technology and innovation. The European
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Commission launched the European Innovation Partnership on Active and Healthy Ageing in 2011, with the goals of increasing healthy years of life and “contributing to the transformation and innovation of health and care in the Digital Single Market”. The 2014-2020 successor to FP7, Horizon 2020, funded a renewed version of AAL with a budget of around €700m to develop and implement ICT for social care. Horizon 2020 also provided €85m for a “Robotics for Ageing Well” programme, and extra funding for a “Knowledge and Innovation Community for Healthy Living and Active Ageing” programme. The European Commission describes the use of ICT in care as a “Triple Win”: improving health and quality of life; supporting the long-term sustainability of health and social care systems; and growing and expanding opportunities for industry and the economy. The UK had a significant level of involvement with and access to this multinational research, and was the single most successful member state in terms of winning care robotics projects, meaning that the vast majority of the UK’s care robot projects have been funded at the EU level. Innovate UK has also had significant involvement with the (Department of Health & Social Care, 2018), and many cross-EU projects have involved UK partners. Leaving the EU may jeopardise access to and involvement with future follow-on programmes on the research, development and trialling of care technologies following Horizon 2020. The effect of Brexit could be particularly acute in Scotland, which has pursued a proactive strategy of collaborative engagement with the EU via a series of telecare and telehealth initiatives.

Telecare, telehealth and telemedicine

Telecare refers to a group of technologies aimed at enabling older people to continue to live in their own homes for as long as possible by connecting users with care services. UK government (e.g. Joint Improvement Team, 2008; Welsh Assembly Government, 2005) often adopt Doherty et al.’s (1996) model of three generations of telecare: a first generation of relatively cheap, reliable personal response and alarm services, whereby a user can press an alarm button or pull a cord to call for emergency assistance; a second generation of continuous smart sensors and monitoring that use algorithms to raise an alarm autonomously if an emergency is detected; and a third generation of devices including 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 users to take medicine.

Telecare overlaps with telehealth and telemedicine, as reflected in the recent shift towards use of the phrase “technology enabled care” to capture all three. Telehealth refers to the remote monitoring of people with chronic conditions to enable a greater degree of self-management, including via remote consultations with clinicians. 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. A unifying aspect of telecare, telehealth and telemedicine is the centrality of data, and the increasing sophistication with which data can be gathered and analysed. The goal of all three is to provide remote services and reassurance in order to enable people to live independently in their own homes for as long as possible while managing the risk of doing so, primarily in order to cut costs while, ideally, improving services. Telecare, telehealth and telemedicine have become an increasingly core, albeit locally highly variable, component of the ICT social care landscape in the UK, and are playing a notable role in reconfiguring important aspects of social and health care systems, particularly in the wake of COVID (LGA, IPC & ADASS 2020; TSA 2020).

Many of the technologies predicted in Doherty et al.’s 1996 paper are now commercially available, and elements of all three generations now co-exist alongside each other. Telecare and telehealth devices are diverse and include various kinds of static and mobile alarms, self-monitoring devices and environmental sensors, as well as algorithms to provide preventive care. They can also include remote video triage outside of GPs’ working hours as a way to reduce the need for ambulance call-outs and hospitalisation – an application that has been used by Airedale NHS Trust in partnership with Immedicare, and by NHS Calderdale CCG as part of telehealth and telecare services inside care homes (Social Care Institute for Excellence, 2018: 11). Some of these devices overlap with the functionalities of smart homes – networked sets of home sensors, appliances and heating/cooling under digital control – as well as personal devices such as smart watches, voice controlled virtual assistants (e.g. Amazon’s Alexa) and wearable fitness monitoring devices (e.g. Fitbit, Apple Watch). There are also increasing numbers of mobile telecare devices and alarms that can be used outside the home.

It is worth taking a brief look at the history of telecare, to understand how views and approaches to care technology have changed over time partly in
response to the experience of earlier policymaking. The government first started to invest in various telecare projects in the late 1990s, and in 2004 the Department of Health announced a major Preventative Technology Grant for English LAs to invest in telecare technology that could keep older people in their own homes and out of hospitals. The Grant was intended to "pump-prime the market and stimulate an industry of huge benefit... We need to work with industry to co-ordinate demand for telecare, ensuring industry grows strong as fast as possible" (Department of Health, 2005: 4). A 2006 White Paper, "Our health, our care, our say: a new direction for community services", similarly focused strongly on telecare, and argued for a whole-system approach to care in order to enable people to live independently in their own homes and thus reduce the long term costs associated with institutional care and hospital admissions (Department of Health, 2006). There was considerable optimism about the potential impact of telecare: the Department of Health 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, while the Scottish Joint Improvement Team predicted that it could reduce admissions of older people to residential care by up to 25% over 20 years (Joint Improvement Team, 2008: 14).

The Preventative Technology Grant provided £80m to local councils in England from 2006-8 to invest in telecare, with the aim of making it available to an additional 160,000 older adults. A parallel project, "Connecting for Health", aimed to establish a national broadband network and national NHS Care Records Service infrastructure to bolster the development and implementation of telecare and telehealth. The total public expenditure on telecare in England from 2006-8 was £132m, and these projects led to rapid growth in the user base, with almost 150,000 new telecare users in England in 2006/7, and an additional 161,000 users in 2007/8. The promotion of telecare by the UK government, primarily through the Preventative Technology Grant, was acknowledged by the Department of Health in 2008 to better understand the impacts of integrated telehealth and telecare (Barlow et al. 2012; Allen & Glasby, 2010). This two-year research project was the largest randomised controlled trial of telecare and telehealth services in the world, involving around 6,000 patients and over 200 GPs in Newham, Kent and Cornwall (Department of Health, 2011). Its results pointed to significant benefits from telehealth, particularly reductions in mortality rate and hospital admissions. However, the telecare aspect of the trial did not demonstrate similar benefits across any of the sixteen measured outcomes. As Steventon et al. note, “telecare did not significantly alter rates of health or social care service use or mortality among a population with social care needs over 12 months” (Steventon et al., 2013: 6). Barlow et al., in a report to the Welsh Assembly, note that there was mixed evidence on the effectiveness of both telehealth and telecare (Barlow et al. 2012). The results of WSD raised significant problems for the government and LAs, which were by that time heavily invested in telecare both financially and politically, as well as for telecare manufacturers and suppliers. Perhaps as a result, the findings of WSD were largely ignored by ADASS and LAs (Woolham, 2019). A follow-up project, UTOPIA, surveyed Adult Social Care Departments across England to reassess the findings of WSD. It found there were limitations in the methodology of the WSD study but that its results were not necessarily “wrong” despite this being a widespread view among LAs (Woolham, 2018; 2019).

The Department of Health launched a second major telecare and telehealth project, 3millionlives (3ML), in 2011, supported by £18m over four years invested by the Technology Strategy Board (now Innovate UK; Department of Health, 2012). 3ML was aimed at scaling up the use of these services by developing the market, improving the global competitiveness of the UK telecare and telehealth industry, and improving users’ quality of life through self-management at home while reducing costs. The Technology Strategy Board was also involved in several successive projects, including the 2011-2013 £4.6m Innovate Assisted Living Innovation Platform (ALIP) programmes. In 2012, it launched the 3-year project “Delivering Assisted Living Lifestyles At Scale” (dallas), intending to build on WSD and 3ML. The aim was "to transform digitally supported self care." The project focused on improving knowledge about and access to existing services rather than providing new services. Dallas was supported by £19m from the Technology Strategy Board, with £1m from NIHR and £5m from the Scottish Government, Highlands and Islands...
Enterprise and Scottish Enterprise (Department of Health, 2016), and established four “communities”: i-Focus, Year Zero, More Independent (Mi) and Living it Up (LiU).

i-Focus was intended to improve consumer choice and access to support and advice, aiming “to promote and encourage a self-care / self-management approach”, in order to develop the market in digital health and care while improving interoperability among assisted living services and suppliers. The Digital Health and Care Alliance (DHACA) was set up to address these goals. Year Zero focused on information governance, and provided a proof of concept of Personal Health Records, but faced barriers when it came to integration across different NHS trusts. Mi, an NHS-led health partnership in Liverpool, aimed to encourage more people to use assistive and telecare technology through a smart house exhibition showcase. LiU was based in Scotland, and aimed to co-design a range of digital tools and a digital marketplace platform to improve health, wellbeing and lifestyles by matching users’ needs to health information, locally available services and activities in the community. Although it set a target of over 55,000 users across Scotland, by 2015 it had attracted only 15,000.

A further 5-year £1.8m randomised controlled trial, ATTILA (Assistive Technology and Telecare to maintain Independent Living at home for people with dementia), was launched in 2013. Reflecting an intensifying focus over the past decade on people living with dementia, this project, involving a collaboration between NIHR, NHS Foundation Trusts, and LAs, aimed to evaluate whether telecare could safely extend the period of time people living with dementia could continue to live independently in their own homes, and whether or not this would be cost effective.

While most of these initiatives focused on England, the pace and level of adoption of telecare and telehealth in Scotland, Wales and Northern Ireland has varied. The Scottish government has been an enthusiastic adopter of telecare and telehealth. The First National Telecare Strategy built on an existing infrastructure of community alarms, and invested more than £20m from 2006-2011 through the Joint Improvement Team’s (JIT) Telecare Development Programme. This led to significant savings and reductions in emergency admissions and hospital bed days (Joint Improvement Team, 2008). According to the Scottish government in their ‘National Telehealth and Telecare Delivery Plan for Scotland to 2015: Driving Improvement, Integration and Innovation’, “around 44,000 people (including over 4,000 people with dementia) received a telecare service as a result of the national Telecare Development Programme between 2006 and 2011, helping to expedite 2,500 hospital discharges and to avoid 8,700 emergency admissions to hospital and over 3,800 admissions to care homes”. The Scottish Centre for Telehealth was established in 2006, became part of NHS 24 in 2009, and was renamed the Scottish Centre for Telecare and Telehealth (SCTT) in 2010, with responsibility for implementing five national projects and creating new standards for telehealth use.

The eHealth Strategy for Scotland 2011-17 assigned telehealth and telecare a central role in transforming the delivery of health and care in Scotland (Scottish Government, 2012). This strategy was operationalised through the 2012-2016 National Telehealth & Telecare Delivery Plan, which, despite the setback of LiU, claimed largely to have met its target of providing telehealth and telecare to an additional 300,000 people, and led to the establishment of a Digital Health & Care Institute in October 2013 (Scottish Government, 2016). By 2015, around 11% of the population aged over 65 were using telecare equipment. A 2016 Technology Enabled Care Action Plan aimed to support a transition to an integrated Digital Health and Care Strategy for Scotland from 2017, with digital technology identified as a “core building block” of care policy (Scottish Government, 2016). The 2018 Digital Health and Care Strategy paper laid out plans to continue the digital transformation of health and care in Scotland, quoting the Scottish Government’s Health and Social Care Delivery Plan: “Digital technology is key to transforming health and social care services so that care can become more person-centred” (Scottish Government, 2018: 23).

The Scottish Government’s implementation of telecare has contributed to the development of a significant strategic relationship with the EU, via Scotland’s 2015 “Action Plan for EU Engagement” and the signing of memoranda of understanding supporting knowledge transfer and research collaboration across EU member states. In 2012, the Scottish Government’s delivery partner, the Scottish Centre for Telehealth & Telecare in NHS 24, received £5m of inward investment from Europe between 2013-2016 in projects such as the SmartCare Falls Prevention and Management programme. In the same year, the European Commission’s Innovation Partnership on Active and Healthy Ageing recognised Scotland as one of three regions in Europe to be a “3-star Reference Site” – the highest such ranking at the...
time – due to work in telecare and risk stratification, and falls prevention and management. In 2015, Scotland was awarded the highest 4-star Reference Site status for work on technology enabled care, having “demonstrated excellence in the development, adoption and scaling up of innovative practices for active and healthy ageing” (Scottish Government, 2016: 13).

A Welsh Telecare strategy was launched in 2005. Before 2006, only around 3,000 individuals in Wales were receiving a telecare service. Following recommendations from the Wanless review for extending ICT, telecare and telehealth services in Wales, between 2006-9, £8.3m of funding was provided through the Telecare Capital Grant, with the aim of providing sensors and equipment to 10,000 homes (Barlow et al., 2010). This target was exceeded, and by December 2009, almost 18,000 individuals were receiving a telecare service (Barlow et al., 2010: 5). As LAs were given significant latitude on how to invest in telecare systems, 60% developed additional telehealth pilots; however, this freedom also led to LAs formulating independent plans and policies, resulting in inconsistent implementation and a “postcode lottery” for telecare charges to citizens. Policy papers on telecare in Wales have struck a more cautious tone than those published by the Scottish Government, highlighting the difficulties of effective implementation and the need for incremental rather than rapid growth in services (Mid Wales Healthcare Collaborative, 2016), while seeing telecare and telemedicine as important in the model of care for rural communities (see the ‘Rural Health Plan – Improving Integrated Service Delivery across Wales’). Further funding has focused on building telehealth and telemedicine, via the £9.5m Health Technology and Telehealth Fund 2014/2015, and the Efficiency through Technology Fund, which provided £250,000 to fund telehealth in Mid-Wales (Mid Wales Healthcare Collaborative, 2016).

Northern Ireland’s Minister for Health, Social Services and Public Safety provided £1.5m in 2008 to fund pilot projects to help develop technologies to enable independent living. Subsequently, the Centre for Connected Health and Social Care (CCHSC) “adopted the largest mainstreamed telehealth service procurement in the UK, involving an £18m remote tele-monitoring contract awarded in 2011 to TF3 (a consortium of Tunstall, FoldHousing and S3)” (Deloitte, 2012: 13) to roll out a telehealth and telecare service including supporting monitoring and self-management for over 3,900 patients with a variety of chronic health conditions, across all five Health and Social Care Trusts, and over 2,300 telecare users (McSorley, 2018; McElnay et al., 2016). This led to the creation of the Remote Telemonitoring Service for Northern Ireland (RTNI), initially operating from 2011-2017. The Telemonitoring NI service centre integrates services for both telecare and telehealth; this is a significant departure from the more decentralised approaches of the rest of the UK. Despite high expectations about the impact of the initiative, a report by Queen’s University Belfast commissioned by the HSC Public Health Agency for Northern Ireland did not find conclusive evidence of positive impacts from telecare (McElnay et al., 2016). As the Executive Director of Fold TeleCare, one of the Telemonitoring NI consortium partners put it, “[t]he Northern Ireland findings were at best equivocal. While the qualitative data gathered from patient, carer, and clinician focus groups and interviews were positive in terms of engagement and on reassurance – to be able to carry on with their lives as usual – the quantitative data did not confirm gains in effective care” (McSorley, 2018).

In summary, telecare and telehealth experienced a rapid rise in implementation and use from around 2006 onwards, driven by national-level government strategies and substantial levels of public investment. While cost savings were not clear-cut, ICT was coming to play a pivotal role in the provision of social care for older adults.

**Digital technology beyond telecare**

Until recently, care technology in the UK had largely been synonymous with telecare, but this is starting to change, with new companies and a broader range of ICT devices entering the care marketplace long dominated by large telecare equipment providers such as Tunstall and Legrand. Some new players provide an extension of “traditional” telecare, selling multifunctional devices that can be used to provide care services from a distance in the user’s own home or, increasingly, outside, for the purpose of maintaining “independence”, while gathering data that can be aggregated and used to manage care or predict future needs. For example, Oysta Technology supplies mobile pendant alarms equipped with GPS that can be activated even when the user is away from home. Another company, Memo, combines telecare sensors with a check-in function that enables caregivers and their tasks to be tracked in real time, so that family members or friends can use an app to monitor an older person and manage and coordinate the care they receive. Some of these new entrants market to a younger demographic than has been previously targeted, such as those
aged 60-70, to give reassurance to the user and their family, and to provide more preventive data tracking services, integrating new monitoring and analytics functionality with existing wearable consumer devices not specifically aimed at the care market.

Considerable resources have been invested over the past decade in the research and development of ICT and robotics for care. The European Commission has been a major funder of such research, with €85m disseminated through Horizon 2020's "Robotics for Ageing Well" programme. The UK has been involved in many of these EU projects, with several part-hosted at major centres of UK care robotics research, such as the Bristol Robotics Laboratory, Sheffield Robotics and the Universities of Hertfordshire, Bedfordshire and Plymouth. For example, the €4.8m 2011-2014 AAL project Accompany involved the trial of the Fraunhofer Institute’s Care-O-Bot 3 at the University of Hertfordshire’s Robot House, a smart home environment designed to test robots to “support independent living in later life”. The €2.6m 2012-2015 AAL project Silver was part-hosted in Stockport, and involved a user engagement trial of the LEA robotic walker. One of three pilots for the €3.3m 2015-2018 Horizon 2020 project Mario, featuring the Kompai robot (made by French company Robosoft, now Kompai Robotics), was also hosted in Stockport, and involved a robot designed to provide companionship and interaction for people living with dementia. The €2.1m 2017-2020 Horizon 2020 project Caresses aims to develop “culturally competent” assistive social robots, and was hosted at the University of Bedfordshire.

Outside of robotics, the EU has also funded various projects focusing more broadly on ICT in social care, including BRAID, a project based at the Queen’s University of Belfast that aimed to develop a roadmap for ICT and active ageing in Europe. The EU has also co-financed Pre-Commercial Procurements or Public Procurement of Innovative Solutions – programmes to encourage the private sector to develop commercial ICT care solutions. These have included eCare, focusing on digital solutions for frailty prevention in older adults; the Silver project mentioned above to commercialise care robots, resulting in the LEA robotic walker; and Stop and Go, a project aiming to procure ICT-based telecare services in Liverpool.

Key UK funding bodies for the research and development of ICT and robotics for care include Innovate UK (formerly the Technology Strategy Board), UK Research and Innovation (UKRI), and the Engineering and Physical Sciences Research Council (EPSRC). Recent projects have included the £1.2m “Trustworthy Robotic Assistants” programme at Bristol Robotics Laboratory (2013-2016), funded by EPSRC, which aims to investigate how robotic assistants can be proven to be safe to use at home. Designability’s 2016-2018 CHIRON assistive robotic systems to enable older people to live at home for longer received £2.2m from Innovate UK (Department of Health, 2017). This project involved a collaboration between Bristol City Council, Bristol Robotics Laboratory, and Designability, with the testing of the Pepper and Nao robots. Further projects at Bristol Robotics Laboratory funded by EPSRC include the £1.2m Right Trousers wearables project (2013-2016), a £2m wearable soft robotics project to support independent living (2015-2018), and the £0.3m I-DRESS project to develop a robotic system to help with dressing.

Despite the promise of such research projects, and the significant investment in them by UK and EU governments, the utility and cost-effectiveness of many of the robotic prototypes has yet to be proven, and very few have been commercialised or are widely available. Those that have been commercialised are often expensive. One of the only social robots to be introduced into daily use in care provision is the Japanese seal-shaped robot Paro, which has been bought by a handful of NHS Foundation Trusts and a number of care homes over the past decade. Recently Pepper, a humanoid robot made by the Japanese company SoftBank Robotics, has been leased by Southend-on-Sea Borough Council mainly to raise awareness about the potential of such robots in care rather than for practical everyday use in care contexts (ADASS, 2019). Bristol City Council has also participated in a trial of Pepper and another SoftBank robot, Nao, via the CHIRON project mentioned above. LAs have tended to rely on such collaborations with academic researchers to trial care robots and other emerging technologies such as virtual reality. An exception is the piloting of the exoskeleton HAL, made by Japanese company Cyberdyne, by the PA Argenti partnership in collaboration with Hampshire County Council, funded by an LGA grant.

The kinds of research projects mentioned above typically take years to translate into consumer products that can be used safely, effectively and affordably in homes – if at all. However, the recent proliferation of increasingly sophisticated, widely available and relatively cheap consumer electronics often designed with some degree of accessibility in mind, such as tablets, smartphones, virtual assistants and apps, has seen the emergence of a bricolage
approach to incorporating such devices into care at the local level. As a report on Assistive and Inclusive Home Technology for people with sight loss notes:

“there are numerous cases of specialist AT [assistive technology] equipment being effectively made obsolete by inclusive mainstream technology (and often by smartphone apps). Highly effective OCR (Optical Character Recognition) reading software or electronic magnification apps can now be obtained for free (after the initial outlay for the mobile device) and can replace specialist equipment that cost hundreds or thousands of pounds. Inclusivity can result in substantially lower costs for consumers of AIT [assistive and inclusive technology]”

Thomas Pocklington Trust, 2016: 5

Many devices being introduced into care, including tablets or voice-controlled virtual assistants such as Amazon's Alexa or Google Assistant, are “generic” consumer products that have not been designed specifically for care and have generally not yet been integrated into existing telecare systems. For example, Amazon’s Alexa (used with the Amazon Echo and Amazon Dot devices) has been trialled across many councils, including Oxfordshire, Norfolk, Richmond, Cornwall and Hampshire, which have developed specialised Alexa functions or “skills” to provide reminders to take medication and help record and manage care tasks completed by caregivers (Allen, 2018; Learner, 2019). In Northern Ireland, under the Integrated Care Programme for Older Persons (ICPOP), tablet computers and smartphones were supplied to staff coordinating the care of older adults in order to facilitate communication and the sharing of information (Health and Safety Executive Northern Ireland, 2013: 39-40). Some devices and systems have been trialled as a result of government technology seed funding awards, in collaboration with academic research projects, or on the initiative of LAs and their innovation hubs.

The Care and Health Improvement Programme (CHIP), launched in 2014/15 by the Local Government Association in partnership with ADASS and NHS England, has actively encouraged the trial and use of consumer devices in care, as well as pilots of other new technologies at the local level (LGA, 2018a & 2018b). CHIP’s Social Care Digital Innovation Programme has been a key driver for LAs to experiment with different technologies, by providing small grants to fund pilot projects. In 2017/2018, 19 councils were each awarded a £50,000 grant, and in 2018/2019, 12 councils were each given £20,000 of funding for a discovery phase, with a potential further £80,000 in funding for a delivery phase. In 2019/2020 a further 12 councils were funded for a discovery phase with a potential delivery phase, with combined funding of £120,000 per project. Other programmes within CHIP include the Design in Social Care Programme, Social Care Data and Cyber Security Discovery Programme and bespoke support for design, digital and information in care and health.

Websites offering online self-services, information about social care services, and health and self-care advice have also been an important area of development over the past decade. A market report on the state of assisted living technologies from 2013 notes that a government White Paper promised £32.5m of start-up funding over 2 years from 2014/15 for LAs to develop websites providing information about local care and support (De Leonibus et al., 2013: 13). Projects such as LiU have aimed at building online communities offering lifestyle and wellbeing advice, and online social interaction and support. New digital assessment tools have also been developed – for example, in 2013, the Justchecking assessment tool was used by LAs across the UK to assess people living at home and suffering from dementia. In Northern Ireland, ICPOP introduced a Single Assessment Tool for assessments of health and care needs, and for care planning and coordination; other online self-assessment tools include AskSara and ADL SmartCare (De Leonibus et al., 2013).

Software apps for mobile phones and tablets have also gained prominence as a technology that can be relatively quick and inexpensive to develop, makes use of existing hardware infrastructure, is massively scalable and relatively interoperable across different consumer devices. ADASS has taken a leading role in encouraging their development. In 2015, it organised the ADASS Care Apps showcase, featuring presentations from developers about apps to support social care, and set up a Public Service Digital eXchange online showcase to bring together social care commissioners and app developers. A small amount of funding has also been provided by national funding bodies: for example, Innovate UK funded the development of dementia-friendly transport apps by the Department for Transport (Department of Health & Social Care, 2018), as well as a Trusted Elderly Care app for tracking by Levstone (Department of Health, 2017). Hampshire County Council commissioned Public Consulting Group UK to develop a “Connect to Support” website (launched in 2016) and app (launched in 2018) for residents to “access information 24/7 to help them to maintain or regain their independence and to manage their own care and support needs” by directing vulnerable people to information that could help address care needs pre-
emptively and prevent them from escalating.

Companies have also been developing apps that connect care workers with those who need care, including platforms such as Supercarers, Elder, My Home Touch, and Nesta’s TrustonTap project. The use of these platforms has been facilitated by the introduction of direct payments and personal budgets for those in need of care, as well as the broader macro context of the UK’s emerging platform economy with flexible “zero hours” contracts for workers, although the employment status of care workers contracted in this way has been disputed. As the report “Making a start in integrated care” noted, one goal of the UK’s Health and Safety Executive People Strategy 2015-18 was to “[e]xplor[e] the use of ‘technology’ to support an agile, flexible and mobile workforce” (Health and Safety Executive Northern Ireland, 2013: 43), and the use of platform apps is encouraging greater flexibilisation of the care workforce. This has accompanied – and been facilitated by – the rapid rise in the number of domiciliary care workers in recent years. Nesta aims to explore “how collaborative platforms can offer alternative operating models for care”, differentiating TrustonTap from other domiciliary care service models in the marketplace through its heavy technology focus, higher pay for care workers, and longer care visits. However, it is still unclear whether the restructuring of the care labour market in a more “agile, flexible and mobile” way will lead to better pay and conditions for individual care workers.

Finally, many apps are linked to smart hubs or other devices, or to telecare or care management systems, and are designed to integrate care work and planning. For example, Memo, mentioned above, combines a “smart hub” with an app for paid and/or unpaid caregivers to “tap in” and “tap out” during visits, which enables data to be gathered to track care visits. These apps often provide data to relatives or friends of care recipients, transforming their role into one of managing and administrating care provided by a flexible care workforce, and also of plugging specific gaps in care tasks more efficiently. The effect of this change in care role has yet to be studied in depth but may effectively function to draw further labour from, and place additional expectations and demands upon, unpaid carers.

In sum, the development of many futuristic high-tech devices such as robots has involved large levels of public investment, but has yielded few tangible results so far, not least because there has been a lack of government support for implementation, as there was for telecare in the 2000s. Far more rapid, however, has been the development of a range of apps and websites related to care, which have not involved such high capital costs, and which are more easily accessible. There has also been a growing interest across many LAs in using consumer electronic devices – particularly Amazon’s Alexa – to provide information and services to citizens related to care. But these technologies throw up a range of new challenges discussed further below.

ICT infrastructure, data and AI

As mentioned above, the project “Connecting for Health”, managed by an NHS agency between 2005-2013, aimed to establish a national broadband network and NHS Care Records Service infrastructure to bolster the development and implementation of telecare and telehealth. Indeed, many new care technologies described above assume that the user has a reliable broadband connection at home and is able to use the internet (issues explored in another Sustainable Care paper ‘Care System Sustainability: what role for technology?’). However, a 2019 survey by the Oxford Internet Institute (Blank & Dutton, 2019) indicated that still only 47% of those aged over 65 use the internet, up from 27% in 2005, compared with 98% of 18-24 year olds. This poses a significant obstacle to ICT projects aimed at providing internet-based digital services in older adults’ own homes for the purpose of maintaining independence. The speed of internet and data connections is also dependent on geographically contingent technological infrastructure: according to Ofcom, as of late 2018, 496,000 rural households do not have access to decent broadband, and only 41% of rural areas have access to the 4G network.\footnote{The Department for Digital, Culture, Media and Sport is supporting ICT network infrastructure related to social care, including the provision of £3.5m for a trial underway in Liverpool to implement a 5G “mesh network” in order to provide services such as confirmation of taking medication via a high resolution 4K video link between a pharmacist and user in the user’s own home. The project is being carried out in collaboration with Liverpool universities, NHS University Research, Liverpool City Region and Blu Wireless. Despite government attempts to trial 5G in a handful of rural areas, 5G is likely to be implemented on a nationwide scale in a similar way to 4G, with a stronger initial focus on more lucrative metropolitan areas, and less network infrastructure in more sparsely populated rural areas, where the private sector business case for building new infrastructure is weaker. Other councils are experimenting with setting up LoRaWans (low-power wireless technologies for the Internet of Things) to provide coverage in rural areas where the cost of installing 4G and 5G networks is too high. However, these networks have limited bandwidth and cannot support high-speed broadband services. Despite these challenges, there is a growing interest in the use of 6G technology to improve internet connectivity in rural areas, but this technology is still in the early stages of development.}
The UK’s 2025 digital switchover, when the analogue telephone network will be switched off and replaced by a digital network, presents a more immediate challenge to existing telecare infrastructure. Many existing telecare devices are only useable on the analogue telephone network and will stop working on or before the 2025 date; they will need to be upgraded or replaced in order to continue to function reliably (Hamblin, 2020). Based on interviews with representatives from LAs conducted in early 2020 as part of the Sustaianable Care Programme, many seem not to be fully prepared for this switchover, partly due to the scale of the challenge. Several were adopting a ‘wait-and-see’ approach, and expected a relatively low-cost solution to be presented by telecare providers closer to the deadline, or for central government to provide assistance.

The infrastructure and governance of data has also become a key concern across government. The National Information Board for England was established in 2014, and made up of representatives from organisations including the Department of Health, NHS England and the Health and Social Care Information Centre, with the purpose of developing strategic priorities for data and technology use across health and social care. Key targets included: all citizens being able to view their care records and to record comments and preferences on this record by March 2018; all patient and care records being made digital, real-time and interoperable by 2020; the universal adoption of the NHS number across care systems, including LAs; and the implementation of common standards and a single clinical terminology (Social Care Institute for Excellence, 2017; see also National Information Board, 2014). These ambitious targets have yet to be met.

Integration of health and social care, as well as of housing and other public services, continues to be on the policy agenda, and many government departments and independent agencies see ICT as a major part of the solution to delivering this ongoing goal. Lack of information sharing and digital interoperability as well as new information governance structures continue to be seen as key barriers to integration (CQC, 2018: 7, 53-55; Localis, 2017; Local Government Association, 2013). Better and more targeted use of integrated data is also directly linked to the agenda for more personalised or “person-centred” care (Localis, 2017). Interoperability and integration of care records involves overcoming the technical difficulties of integrating different, often proprietary, IT systems and software. In particular, the digitalisation and sharing of NHS electronic patient records so that local care systems do not resort to resource-intensive workarounds (Local Government Association, 2013) has proven difficult, as different NHS foundation trusts often use different systems. The complexity of integrating different sources of data has intensified with the introduction of proliferating numbers of telecare, telehealth and telemedicine devices, monitoring systems, and care management systems, all generating different kinds of user data. The experience of the “Connecting for Health” project may be one reason for caution among politicians in becoming involved in national-scale IT infrastructure and integration projects with the potential for spiralling cost and mismanagement by external technology consultants. The project was widely panned as an expensive failure: a member of the Public Accounts Committee described it as “one of the worst and most expensive contracting fiascos in the history of the public sector”.

Nevertheless, attempts have been made to improve integration, for example through the 2012-2015 Dallas project’s i-Focus initiative mentioned above. In 2015, NHS England set out its Five Year Forward View and Personalised Health and Care 2020 plan for using information and technology and ensuring that patient records are digital and interoperable by 2020 (NHS England, 2014). In response to the Forward View, as well as to the National Information Board’s framework, local health and care systems were asked to product Local Digital Roadmaps setting out how they would achieve these goals. These Roadmaps were published in 2017, and included:

“an outline of the baseline position and information maturity; a readiness assessment; a capability deployment schedule; intended steps to ensure information-sharing and implementation of interoperability principles; and plans to further develop the infrastructure and to improve collaboration between professionals from different organisations within the local health and care system”

Social Care Institute for Excellence, 2017: 81

The Scottish government made ensuring citizens had online access to their Electronic Patient Record a key deliverable of the 2016 Health and Social Care Delivery Plan, and Scotland’s 2018 Digital Health and Care Strategy paper laid out plans to build a Scottish health and care “national digital platform” to share health and care records in real time, although this would not share data across the
UK, but only within Scotland. The aim of integration was further reinforced through legislation, with the UK government’s Health and Social Care (Safety and Quality) Act 2015 making it “a legal requirement to share information where it is likely to facilitate the provision of health or care services and is in the individuals’ best interests” (DH & DCLG, 2017).

One of the goals of integration is to enable patient records and other data to be aggregated in one place. However, the problem of how to use the growing mountain of historic and real time data about individuals and their care increasingly available to local councils, creates new technical issues around data governance and organisational culture as well as raising significant ethical questions. Many local councils lack the resources and technical capacity to utilise the huge amounts of data being generated particularly by the boom in telecare since the mid-2000s (e.g. Scottish Government, 2016: 9; ADASS, 2019), although some (for example, Liverpool and Leeds) have begun to set up data trusts or “mills” to ensure data privacy while encouraging anonymised data to be used innovatively to provide better services. At the national level, the Health and Social Care Information Centre was set up in 2013 and rebranded as NHS Digital in 2016, with a remit involving not just health but also social care services. However, at the local level, specific expertise in data science is often not available, and organisational culture is sometimes not conducive to utilising data. As the CQC stated in a 2018 report,

“Five years ago, an information governance review, To share or not to share? found that, ‘a culture of anxiety permeates many health and social care organisations from the boardroom to frontline staff. This leads to a “risk-averse” approach to information sharing, which prevents professional staff at the front line cooperating as they would like’. We found that the same challenges still exist.”

CQC, 2018

Challenges around how data can and should be used have been exacerbated by data privacy issues and the EU’s implementation of the General Data Protection Regulation (GDPR) in 2018 (passed into law in the UK as the Data Protection Act 2018), which introduced new data protection and privacy rules governing citizens’ data. The introduction of GDPR has greatly raised the profile of data privacy, although the implications of how this law applies in the context of social care technologies are still not entirely clear. Data security is another key issue, and a significant area of digital infrastructure investment.

NHS Digital’s Data Security Centre was commissioned by the Department of Health to develop a Care Computer Emergency Response Team (CareCERT), which was launched in 2015 and provides advice and guidance about how health and social care organisations can respond effectively and safely to cyber security threats.

Several LA data analytics projects and pilots have focused on care prevention. Shropshire Council’s “The Bridge” project was part-funded by CHIP’s Social Care Digital Innovation Programme, and provided immersive visualisations of combined datasets from health and social care, the Office for National Statistics, as well as thermal mapping of homes, to improve the efficiency of commissioning and enable preventative care by identifying “those in a cold home, over 75, living alone and not known to social care” (Social Care Institute for Excellence, 2018; Local Government Association & NHS Digital, 2015). Other preventive projects include ARMED, by HAS Technology. ARMED uses a variety of in-home sensors and a wearable device to gather data on hydration level, body composition, grip strength, adherence to medication, frequency of trips to the bathroom, and physical movement, as predictors of urinary tract infections and weakness, which in turn can be predictive of the risk of falling and hospital admission. These data sets are analysed using Microsoft Azure Machine Learning Studio, and used to direct interventions to prevent falls; a 2018 trial indicated a high degree of accuracy and there are plans to roll this system out through Argyll and Bute Council’s Health and Social Care Partnership as part of the hospital discharge and reablement process. The Social Care Institute for Excellence (SCIE) points to Northamptonshire’s Canary Care as an example of active monitoring of older adults with lower level care needs, and suggests that data collected through telecare devices could be used proactively to remind users to stay hydrated, get their flu vaccinations, practice exercise routines, and so on.

Other LAs have turned to technology and AI companies for data analytics and insight. For example, Harrow Council has partnered with IBM’s Watson Care Manager, while many LAs are using Amazon’s Alexa, which can store and analyse user data. This in turn has led to a somewhat paradoxical situation where data privacy issues are treated by some LAs or parts of LAs in a risk averse manner, while new systems being piloted by other LAs or their new innovation hubs share citizens’ personal data with corporations like Amazon, Google or Microsoft, facilitated by opaque software license agreements. Providing large corporations with access to citizens’
personal data is coming under increasing scrutiny: as in the cases of Sidewalk Labs, the sister company of Google, which was accused of “surveillance capitalism” in its smart city development in Toronto, or the Facebook-Cambridge Analytica scandal, there is little transparency from these corporations on how this data is stored, used or commercialised. In 2018, the Department of Health published a code of conduct for data-driven health and care technology, following criticism in 2017 by the Information Commissioner’s Office about the use of NHS patient data by Alphabet company DeepMind for its failure to comply with the Data Protection Act. This code of conduct was updated in 2019 following feedback, and includes a third principle to “[u]se data that is in line with appropriate guidelines for the purpose for which it is being used” (Department of Health & Social Care, 2019). However, problematic data governance practices persist: in November 2019, it was revealed that Google has secretly accessed the complete health records of up to 50 million Americans without the knowledge of the patients themselves or their doctors, for the apparent purpose of developing its AI capabilities. An investigation by the Financial Times has revealed that Google also has secret access to large amounts of sensitive health data relating to UK citizens, shared by some of the UK’s most popular health websites. In the case of projects using products such as Amazon Alexa, the problem is usually circumvented by LAs providing apps rather than the device itself; the consumer therefore agrees to the company’s data agreements directly without involvement by the council.

Collaborations with technology companies reflect a shift in state investment and focus towards AI as part of the UK Government’s broader Industrial Strategy: two of the four “Grand Challenges” identified by the Department for Business, Energy and Industrial Strategy are the ageing society and AI and data. The Government’s recent “AI Sector Deal” provided £950m of public support, and led to the establishment of a new institutional governance structure for AI and data, including a Centre for Data Ethics and Innovation Consultation, a UK AI Council, and an Office for Artificial Intelligence within the newly created Office for Artificial Intelligence, Digital and Tech Policy. A “Regulatory Horizons Council” was set up to advise on regulation of AI and other key technologies for the “fourth industrial revolution”. In August 2019, the Secretary of State for Health and Social Care announced plans to create a National Artificial Intelligence Lab for the NHS in England, aimed at managing “the digitisation of the health and care service”, as part of a broader £250m investment. While these kinds of projects involving novel syntheses of data, AI, and the use of telecare and internet of things infrastructure to communicate directly with people in their own homes in a highly personalised way may improve health outcomes and reduce the use of more labour-intensive care services and the overall cost of care, they also raise important questions about the role of LAs in the lives of citizens. To what extent should LAs generate new data about citizens by aggregating manifold forms of data across departments – with or without individual citizens’ consent, and potentially without transparency where this process is outsourced to technology companies with strong commercial interests – with the intention of investigating, analysing and intervening in their lives and lifestyles?

**Discussion: precarious technologies, digital ableism and co-production**

“*Our system of care and support, developed in a piecemeal fashion over more than six decades, is broken and in desperate need for reform.*”

Department of Health, 2012

The characterisation of the UK’s systems of social care as “broken” has been a common motif over the past decade, reinforced by continuing real term cuts to LA budgets. In particular, England’s system has become ever more precarious, with many care home companies either in administration or close to collapse, a precarious workforce with a high attrition rate working for minimal pay, and some older individuals having to sell almost all of their assets to fund their own care. The impact of COVID-19 is likely to exacerbate these problems, as care home occupancy rates fell, as did the use of domiciliary care. In the absence of top-down political leadership in proposing solutions to issues around social care funding, delivery, and workforce, technology is fast becoming the most important de facto strategy among LAs for the future of adult social care. Depending on technology for the future of care comes with both opportunities and risks.

The digital transformation underway across social and health care, as well as the wider economy, create compelling opportunities to collect and share data to drive improved outcomes for older people. At the same time, many policy documents and grey literature reports identify issues of cost, lack of evidence for benefits, lack of interoperability between new and legacy systems across health and social care, and complex issues of data governance, including privacy and data security, as barriers to wider adoption of new ICT technologies (e.g. CQC,
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This fragmentation is a reflection of the lack of national-level funding and strategy to push new technologies on the same scale as the widespread implementation of telecare in the early 2000s. Implementation of much new ICT for social care has been left to LAs, which have limited technical capacity, capability and resources to assess these technologies and make commissioning decisions, thereby creating bottlenecks that can impede their use. Trials of relatively expensive new technologies such as robots or virtual reality have been small-scale and inconclusive with regard to benefits and cost savings. The danger of a LA-based approach to sophisticated new technologies is that this will contribute to unequal distribution: LAs have varying levels of expertise in specialised areas such as data science and AI, as well as skills in procuring innovation funding or bringing together public-private consortia such as the PA Argenti partnership. There is a fundamental mismatch between LA responsibility for delivering social care in discrete local silos, and the growing imperative to plan and implement interoperable, highly complex systems across the UK to gather, analyse and action big data sets in real time. A national strategy for technology in social care may have the potential to be more successful in trialling and scaling up technologies that are found to be effective.

Partly in response to these issues, we have seen a growing trend among councils towards making use of existing everyday “generic” consumer technologies such as Amazon Echo, iPads, Facebook, Skype, Whatsapp and so on. These technologies are cheap, powerful, familiar to many people, and often designed with a degree of accessibility in mind. They also avoid the stigma and user rejection traditionally associated with telecare devices such as “beige” pendant alarms (Allen, 2018). Yet despite the ubiquitous rhetoric of “co-production” in social care discourse, it is unclear whether such an approach involves true participatory co-production on the part of end users or other stakeholders, since they are dealing with the finished commercialised product and may have limited influence over the corporate development process of a relevant app or, for example, “Alexa Skill”. Making widespread use of consumer products would in fact seem to run directly counter to the ethos and practice of co-production. It may also be politically and ethically problematic to use taxpayer money to effectively commission social care services from technology corporations such as Amazon, a company widely criticised for paying only £14m in corporation tax on £2.3bn of UK sales revenue in 2018 (Hamblin, 2020).

Applying new consumer ICT products also carries another risk, exemplified by the case of Jibo, a social robot introduced in 2017. Less than two years later, in homes across the US, Jibo abruptly announced to its owners that its servers were about to be shut down. The majority of staff at the company were laid off, and the company, which had raised $73m in venture capital funding since a successful crowdsourcing round in 2014, sold its intellectual property and collected data to SQN Venture Partners. This event demonstrates the fragility of new ICT service-providing products reliant for their continuing day-to-day functioning on the ongoing support or solvency of their manufacturer. Two of the benefits of traditional telecare have been its technical reliability and long contract periods, despite the relatively slow incremental technical improvements that have largely characterised the industry to date. Yet the use of generic products yokes long-term social care services to the relatively short-term lifecycles of consumer technologies. For example, the robot Pepper, despite having been introduced in the UK only recently, and promoted as the latest in robotic technology, may prove to be short-lived based on the evidence that 85% of businesses using Pepper in Japan, where it has been available since 2015, failed to renew their leases when they started to expire in 2018.

Moreover, as Professor of Health Services Gail Mountain asks, “[a]s everyday technologies become more usable, sophisticated and ubiquitous, will the demand for specialist equipment decrease, with their functionality being replaced by readily available devices?” (Age UK, 2013: 81). The increasing use of everyday consumer electronic devices not specifically designed for care is already displacing more expensive, specialist care technology (cf. Thomas Pocklington Trust, 2016). During this transition to more accessible generic products and digital technologies, the widespread introduction of a range of digital products risks leading to a highly fragmented, unstable and precarious care technology landscape.

It is further important to note that the digital turn towards websites, apps, and networked devices that
depend on a broadband internet connection is likely to exacerbate a digital divide in the application of ICT, with around half of older adults not using the internet (Blank & Dutton, 2019). Rural-urban differences in the quality of broadband, and 4G and 5G supply could also lead to inequality in the uptake of increasingly internet-based care services (Hamblin, 2020). While new technologies are being championed for older adults, as we have seen, they may be the members of society least willing or able to use them. As services increasingly shift online, vulnerability to internet outages, network slowdowns, and internet or Wi-Fi equipment failure is also likely to increase.

A further theme identified in this paper is the central policy focus on and investment in older people who are still able to live independently. Most technologies mentioned in policy documents attempt to extend for as long as possible the period of time before older people start to require institutional care. This group of older adults represents the main target of ICT products and innovations, particularly tele-technologies, virtual assistants, monitoring devices, companion robots and so on. This has the twin benefits of catering to a widespread desire among older people to be able to stay in their own home, and helping to reduce costs by reducing the number of older people moving into expensive residential care or hospital. However, concentrating resources on this single group of users runs the risk of creating a new technological divide based on a form of digital ableism between those who are able to live independently and have most available technological resources and funding expended on their behalf to enable them to stay independent, and those who require more intensive residential care. This may constitute a cliff edge of spending on technologies pre-institutionalisation, with little spent on those who are no longer able to live independently. There is also the risk that people will be treated as independent simply because they have technology in their home, or that independence will be conflated with well-being, because this suits a cost-cutting agenda. ICT for independent living, particularly in the form of increasing remotely or digitally delivered services, may essentially institutionalise some older people in their own homes, and lead to a reduction in human to human contact in daily life (KPMG, 2014).

The technology that has been developed in the care sector both influences and is influenced by the care landscape and situation of care policy and funding in the UK. An absence of top-down political leadership is reflected in the plethora of small-scale pilots by LAs. The reduction in funding of social care is reflected in the primary focus on technologies to cut costs by supporting independent living, by applying cheap generic consumer electronics to care, and by developing apps and devices to encourage unpaid carers to provide more labour in the form of care, managing care, and indeed managing care technologies. The move towards more domiciliary care has been facilitated by the move towards independent living and the introduction of more telecare infrastructure, as well as by national policies enabling greater flexibilisation of the labour market at large, which in turn has enabled the emergence of digital platforms for care workers. As TSA president Alyson Scurfield mentioned at the TSA’s 2019 ITEC conference, it is important to view new technologies not simply as discrete “widgets in a box” (Presentation, 15th October 2019) to be parachuted into an existing care context, but rather as part of the broader assemblage of care: both reflective of changes to the care system and contributing to changes to the system as a whole, often in unexpected ways. In order to find effective and sustainable solutions to the crisis in social care in the UK, new technology alone is not the answer: we need a holistic approach that does not just focus on individual devices but looks across the whole care system.

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Endnotes

1 The grey literature includes government reports, policy statements and papers; conference proceedings; research reports; fact sheets; and funding calls. These have been sourced from a number of search facilities and websites, such as those collating policy documents (https://www.gov.uk/government/publications; www.bl.uk/social-welfare) and organisations relevant to social care (the Kings Fund, the Social Care Institute for Excellence, Skills for Care, ADASS, LGA, TSA).

2 Health care technologies were out of scope of this report except where the primary aim of the technology was for use in social care.


4 Eg, through its close association with TSA and through its own Digital Communication and Technology Group. In a speech at the TSA’s 2019 ITEC conference, the president of ADASS, Julie Ogley, described technology and digital as one of three key enablers in social care.

5 Eg, Oxfordshire County Council has started an Innovation Hub; NHS Grampian and NHS Medway have innovation hubs for health and social care; Buckinghamshire New University, Buckinghamshire Healthcare Trust, Oxford Academic Health Science Network, Buckinghamshire Clinical Commissioning Group and Buckinghamshire County Council, supported by the European Regional Development Fund, have collaborated on the creation of Bucks Health and Social Care Innovation Hub, run by Bucks HSC Ventures.

6 Examples of these technologies include: personal alarms in the form of pull cords, pendant buttons and wristbands; gas, carbon monoxide and flooding detectors; bed moisture detectors; physiological sensors related to the body, such as devices to measure heart rate and heart beat abnormalities, temperature, blood pressure, blood oxygen, blood sugar, lung capacity, sleep quality, grip strength, as well as weighing scales that can measure body composition and hydration level; and sensors related to spatial tracking, such as pressure pads, accelerometers to detect when a door is opened, personal trackers that use the global positioning system (GPS), activity level monitors, as well as gait analysis and fall monitoring and prediction.

7 EU projects require collaboration between multiple member state partners.

8 This is not a comprehensive list but rather a snapshot of some of the many recent and ongoing publicly funded robotics projects at UK universities aimed primarily at supporting independent living among older adults.

9 For example, the humanoid robot Pepper costs around US$25,000 leased over a period of three years, but is not currently commercially available in the UK. Paro, a seal-shaped therapy robot, costs £5000 excluding VAT.

10 To avoid possible stigma in the UK surrounding the term “robot” (implying a machine replacing a person), as well as the negative pop culture connotations of “HAL” (the killer AI from 2001: A Space Odyssey) and Cyberdyne (the company that produced the deadly terminators in the Terminator movie franchise), Argenti branded the exoskeleton a “cobot”, emphasising the collaborative nature of the device and the fact that it is controlled by the human care workers rather than vice versa. This can become confusing, as “cobot” is also used to refer to “co-working” robots that assist human workers in factories, such as Rethink Robotics’ Baxter robot.

11 Ofcom defines “decent” broadband as having a download speed of at least 10 Mbit/s, and an upload speed of at least 1 Mbit/s.

12 This also highlights the fact that when companies are sold on, the personal data collected through their products may go with them, further complicating issues of long term data security and privacy.
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ABOUT THE RESEARCH
The Sustainable Care: connecting people and systems programme explores how care arrangements can be made sustainable with wellbeing outcomes. It studies the systems, work and relationships of care in the context of changes in technology and mobility and aims to support policymakers, the care sector and academics to conceptualise sustainability in care as an issue not only of resource distribution, but also of rights, values, ethics and justice. The programme focuses on adults living at home with chronic health problems or disabilities and their families, carers and paid workers. Funded by the UKRI Economic and Social Research Council, it is delivered by eight universities and Carers UK, led at the University of Sheffield by Professor Sue Yeandle.

This working paper was prepared by Dr James Wright as part of the programme’s work on Care, Sustainability and Wellbeing: A conceptual and analytical framework for policy and practice in care and caring, led by Dr Kate Hamblin. The paper was designed by Dr Kelly Davidge.

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