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Automating adult social care in the UK: Extracting value from a crisis

Caleb Johnston [a,*], Geraldine Pratt [b]

[a] School of Geography, Politics and Sociology, Newcastle University, Newcastle upon Tyne NE1 7RU, United Kingdom
[b] Department of Geography, University of British Columbia, 1984 West Mall Road, Vancouver, British Columbia V6T 1Z2, Canada

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ABSTRACT

The UK appears fixed in perpetual care crisis propelled by austerity-driven funding cuts and the country's intensifying care labour shortage. Austerity in the UK has generated an operating environment that has accelerated privatisation and incentivized and necessitated private innovation. In this writing, we examine how the infrastructure and delivery of social care in the UK is being radically reimagined through technology. Promising to deliver critical efficiencies and cost savings, new automating technologies are being tested and introduced to reorder how and where care is managed and delivered. Drawing on a series of interviews conducted with local authorities in the UK and the executives of private companies, our task is not to assess the efficacy of new technologies; rather we examine how these public-private partnerships raise difficult questions: Who will deliver caring futures in the UK? Who is absorbing the fiscal risk of technological innovation? Who is profiting? And what are the limits of technology as a response to our care crisis?

1. Introduction

Austerity, labour shortages and demographics frame a crisis that is driving innovations in the automation of adult social care. In an interview in 2021, the Head of Strategic Commissioning for one of the UK's largest local authorities outlined the problem. There is a deficit of roughly 6000 care workers across his region. Moreover, for well over a decade, his local authority has experienced annual funding "deductions". And yet an expanding aging population ensures increased demand for adult social care services. A technology entrepreneur with whom this UK local authority now partners provided a solution: "Eleven/twelve years ago when austerity was just starting […] I pointed out to a couple of local authorities that [technology is] part of the answer to their financial stability challenge." Adult social care, he noted, is a "demand-led service" and "you just have to pay for whatever turns up. If that's twice as many people as last year, it's going to be twice as expensive." This technology entrepreneur went on to say that, running "in parallel" to the discussion of technology as the answer to the budgetary crisis, has been a conversation about delivering adult social care in new and innovative ways. The interplay between austerity, crisis narratives, demographics, technological innovation and public/private partnerships is the focus of this paper.

In the UK a crisis scenario tied to an explosive growth in spending associated with an ageing population has legitimated austerity and spending cuts, which, since 2010, have radically altered the terrain of social reproduction. Austerity policies have slashed the budgets of local authorities, with a projected 63% reduction of funding in real terms between 2009/10 to 2019/20 (Atkins and Hoddinott, 2023, 6). Deep and sustained funding cuts have been highly uneven across the country with the deepest cutting made in the most deprived areas of the country. Branded by Tory governments as a necessary means of rebuilding the UK economy, austerity policies have forced many local authorities to focus resources on the delivery of their ever-stretched statutory services (i.e., social care, waste collection, child protection services). While uneven, the ongoing and long-term effects of austerity on local councils have been severe, many are now 'hollowed out' (Atkins and Hoddinott, 2023, 4), and in December 2023, the UK government's Levelling Up, Housing and Communities Select Committee heard evidence suggesting that up to half of England's 318 authorities may well be forced into insolvency within the next year. There is now said to be an 'existential threat' to local services across the UK (Savage, 2023).

Austerity has also intensified a crisis of care labour in the UK. In 2023, there were 152,000 daily vacant roles in social care in the UK, with suggestions that if the workforce were to grow in step with an ageing population, the country will require an extra 440,000 social care workers by 2035 (with 440,000 workers reaching retirement age in the

* Corresponding author.
E-mail addresses: caleb.johnston@ncl.ac.uk (C. Johnston), gpratt@geog.ubc.ca (G. Pratt).

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next 10 years) (Skills for Care, 2023). The systemic underfunding of care infrastructure in the UK has resulted in the proliferation of zero-hour contracts and widespread 'poverty-pay' (Hussein, 2017; MacLeavy, 2021) among social care workers and has produced the highest rates of staff turnover of any sector in the UK economy (Horton, 2019; ONS, 2020). Deep spending cuts coupled with acute labour shortages have returned care to households as private and personal responsibilities. Between 2011 and 2019, the number of informal carers over the age of 65 increased by 43 percent (Dowling, 2022, 85). UK Carers (2022) estimates that the number of unpaid carers in the UK could be as high as 10.6 million, with 4.7 % of the population in England and Wales providing 20 h or more of care per week. Over the period between 2010 and 2020, 4.3 million people became unpaid carers: roughly 12,000 people per day (Petrillo,Bennett and Pryce, 2022). The majority (59 %) of unpaid carers are women, with more women forced to leave paid employment to shoulder high intensity care work. Between 2010 and 2020, people aged 46–65 were the largest group to become unpaid carers (ibid.). Absorbing more and more care work within families is producing unprecedented financial stress. UK Poverty (2022) argues that 44 % of working-age adults caring for at least 35 h per week is living in poverty (cited in Petrillo, Bennett and Pryce, 2022), with the Carer's Allowance main state benefit of many (at £76.75 per week in 2023/24 for a minimum of 35 h of care work per week). The UK Carer's Allowance is the lowest state benefit of its kind. Skeggs terms the trend of offloading the labour and cost of care to families a "responsibility transfer" in the work of social reproduction (2021, 134), a longstanding pattern within capitalist societies (Federici, 2012; Fraser, 2022; Meehan and Strauss, 2015; Mitchell, Marston and Katz, 2012).[1]

At the same time, the cuts to publicly provided social care have "turbo-charged" trends of privatisation, marketisation and financialization of care services (Dowling, 2022, 4; see also Horton, 2021, 2022; Lorne, forthcoming). "Where cuts have hit, they have created funding gaps to which further privatisation and outsourcing, marketisation and financialization are considered to be the solution" (Dowling, 2022, 4). Between 2010 and 2020, austerity policies cutting local authority funding in the UK took place at the same time as more responsibility for public health was shifted from central to local governments (ibid, 55).[2] In line with the notion that the older population is the most disposable, in the UK the cuts have been deepest for adult social care: between 2009 and 2015 local authority funded social care fell by 20 % (ibid., 84). The number of adults receiving social care was 50 % lower in 2018 than in 2009 (ibid., 56). Cuts to adult social care have redistributed costs to more expensive health services: with a 30 % reduction to social care spending for people over 65 between 2009 and 2016, trips to Accident and Emergency (A&E) facilities rose significantly (Dowling, 2022, 67). A resultant crisis of services at A&E facilities has then fueled narratives of crisis in the health sector. It is in this context that local authorities began heeding the advice of the technology entrepreneur quoted above by experimenting within automating adult social care. Austerity has created an environment in which managers are both compelled and empowered to experiment and innovate by introducing new systems and technologies.

Framing the increased demand for health care by an aging population as a fiscal crisis that threatens the national economy lives within a long history of narrating this generational demographic in crisis terms. Because of their demographic size, baby boomers have been regarded as a crisis-generating generation. What has been termed the 'grey or silver tsunami' of baby boomer seniors (e.g., Economist, 2010) is a continuation of a 'tidal wave' of baby boomer students in the 1960s (Bouk, 2018, 331). "[P]opulation researchers [have] repeatedly presented the bulge as a looming disaster and paved the way for a literature setting up the mass of baby boomers as the agents of continuing crisis and disruption" (ibid., 2018, 323). Bouk traces the work that the rhetoric of crisis has accomplished in the United States. Shortages of teachers in the 1950s and 1960s were blamed on the boomer population bulge rather than low wages and poor working conditions created by underinvestment in public education. As the boomers have aged, the crisis rhetoric has more recently been deployed in the United States to build support for cuts to the social welfare state, including efforts to privatize social security. It has both justified cuts (which affect a much wider population than boomers) and obscured a broader set of political, economic and social processes.

Twinning national economic health and population management also has a distinctive history, which Murphy conceives as the "economization of life" (2017, 6). Murphy focuses on the promotion of birth control as a development strategy in the global South in the 1950s through 1980s as one important manifestation of the economization of life.[3] But by the 1970s population control in the global South was increasingly criticized as racist and genocidal, and new generations of demographers and public and private funders in the global North redirected their attention inward, away from reducing fertility rates in the global South to "improving health" at home (Merchant and Alexander, 2022, 181). We can find no starker expression of the pairing of population management and national economic prosperity than the private message from British Prime Minister Boris Johnston to a colleague in October 2020, in which he opposed the third lockdown during the pandemic with the justification that those who were dying were "all over 80" (BBC News, 2021, cited in Skeggs, 2021). Skeggs (2021) uses the term necroeconomy to encapsulate the abandonment of the older population to allow the economy to thrive; Lincoln (2021) frames it as necrosecurity (see also Krupar and Sadural, 2022). Alongside selective abandonment, healthy ageing has emerged in "innovation policy agendas as [a] key justification for action, providing strategic direction for funding policies and innovation efforts" (Mazzucato, 2022, 5). In Murphy's terminology, these innovation policy agendas are "assembling life toward other futures" (2017, 1).

We turn to focus on partnerships that have emerged over the last decade between local authorities in the UK and private tech companies to cheapen costs and simultaneously reformulate the delivery of adult social care. The tech on offer is extensive (Schwiter and Steiner, 2020). It ranges from companion robots (Del Casino, 2017; Gray, 2021; Lynch et al., 2022; Pratt et al., 2023), to cobots to assist with lifting (Wright, 2018, 2023), to sensors that monitor movement and hydration in the home (Woods and Kong, 2020; Reid, 2022), to software used to manage staffing (Dowling, 2022), to computational linking of patient data across NHS, adult social care and GP offices, to machine learning or AI to predict declining health (in particular, falls, urinary tract infections, dementia).[4] We focus here mostly on technology used for monitoring (through sensors, GPS and the like) and data integration. These are

[1] Our work examining the automation of care sits within and extends the considerable attention paid to the sustained and ongoing effects of fiscal austerity in the UK, see Peck, 2001; Peck and Tickell, 2007, Horton, 2017, Power and Hall, 2018, Strong, 2018, Hall, 2019, Wilkinson and Ortega-Alcázar, 2019, Barford and Gray, 2022, Stenning, 2023.

[2] The systemic underfunding of local UK authorities is especially significant because they have a statutory obligation to provide care – including elder care.

[3] Murphy details John Maynard Keynes' application of eugenics to macroeconomics. Keynes believed that the reduction of population resulting from the plague in the Punjab were correlated with increased wages and prosperity for future generations: "[D]eath from plague for Keynes became a 'beneficent visitation." (2017, 21).

[4] These partnerships between private technology companies and local authorities sit within a substantive digital transformation which is taking place across the UK health and social care ecosystem. One key component of this emerging digital infrastructure is ongoing efforts to create 'connected digital systems' across the country in which digitised data from patient records can move across different integrated care systems: i.e. National Health Service, local social care services, GP offices.

being introduced by local authorities to cut costs of adult social care, deliver services aimed at keeping an aging population in their homes (i.e., healthy aging), and – possibly – to predict and prevent costly health events that necessitate nursing home care, or trips to hospital Accident and Emergency (A&E) departments.

We cannot say whether the automation of social care has had or will have good or bad outcomes; this is not the focus of our attention. We can say that technology is reordering how and where care is delivered and by whom, and who pays and profits from it. The transferring of responsibility for care from national government to local authority to family to individual is one issue. And so too is the issue of who pays and who profits from this crisis response. Private companies are capitalising on the care crisis by developing their products and markets through partnerships with local authorities. A crisis discourse can close debate, such that these arrangements appear to be the only alternative.

When the rhetoric of innovation is ladled into a crisis opportunity it can seem that innovation is coming from the tech companies. But as Mazzucato (2017) argues, it is the state that often takes the entrepreneurial role. It is often the state that is the risk taker and the market maker. Private capital enters after the real risk has been absorbed by the state. This runs counter to capitalist narratives of experimentation, innovation and risk-taking that legitimate the socialisation of product development and the privatisation of profits. A limited view of the state as wealth maker leaves the state "more vulnerable to being captured by vested interests, and 'rent seeking' behaviour; and has increased inequality by allowing some actors to exaggerate their role in creating wealth, and extract value well beyond their contribution to its creation" (Mazzucato, 2022, 1). Public entrepreneurship runs through the whole innovation chain, including public procurement. Procurement, Mazzucato argues, is an area of state investment in which the socialisation of risk should most emphatically be accompanied by the socialisation of rewards. "[D]ownstream investment targeted at specific companies and technology is qualitatively different" than investments in education and research "[p]recisely because some investments in companies and technologies will fail" (2022, 8). In her view the state should treat investments in specific companies and technologies like an investment portfolio to enable the successes to cover the costs of the expenses associated with the risks. We focus here on the process of public procurement and its role in product development and market making in the adult social care sector at this moment of a widely proclaimed (and actual) crisis in the provision of care. We do this with an eye on where innovation and risk absorption lies and who might more appropriately profit from it.

A crisis in care, as Fraser and others have argued (2022, Gray, 2021), is a crisis of capitalism. The labour of care is essential to the functioning of capitalist societies. But crucially, the labour of care straddles non-economic and economic spheres of life, and retains a set of values and norms that differ from those foregrounded within capitalist societies: an ethics of mutual responsibility, interdependence and stability, rather than individual choice, efficiency and growth. Though these values are typically coopted (witness the exploitation of these norms for those in the care professions: Folbre, 2006), they provide the grounds for a *normative* critique that can be mobilised to anti- or non-capitalist ends, or in Murphy's terms, for assembling life to other futures. Alongside this normative critique, Gary (2021) assesses the automation of care by also drawing on Fraser's *structural-ethical* critique that capitalism diminishes the possibility of collective self-determination. She asks: what life options are "foreclosed by the encroachment of the capitalist economy into the sphere of social reproduction" (2021, 31)? We parse innovation in private–public partnerships in tech development for healthy aging with an eye towards these opportunities and foreclosures.

We are drawing on online interviews carried out mostly between June 2021 and August 2022, with 11 senior managers/employees in 9 different local UK authorities, 15 executives in 13 tech companies, and 3 representatives of third sector organisations, as part of a scoping study of gerontechnologies. The research had ethical approval from our respective universities. Not surprising, given the competitive nature of this field, we were sometimes asked about our funding or sponsorship and we made clear that this was an academic research project. We conducted unstructured interviews of roughly an hour each. In some cases, we have later returned for a follow-up zoom interview. A good number of interviewees were first met at health and technology expos or conventions where companies pitch their technologies to the NHS, local authorities and nursing home companies. Our claims about the reputations of particular local authorities or companies are in part based in this ethnographic research. We attended three of these conventions in person, and a further three remotely. Other interviews were referrals from the original interviewees, suggested because of their leadership and impact in the area of gerontechnologies. In part reflecting the network sampling methodology, our strategy has been to triangulate a number of interviews around partnerships, that is, to interview partnering local authorities and tech companies. We present here case studies of three such local government-industry partnerships, drawing on interviews with 16 individuals, including six tech companies and representatives of seven local authorities.

2. Hampshire County Council/ PA Consulting

Our first case is Hampshire County Council. Hampshire is one of the largest local governments in the UK and has been experimenting with technology to provide adult social care since at least 2012. The immense pressure driving this experimentation was made apparent in a letter written by the Leader of Hampshire County Council (with the Leader of Kent County Council) to the Prime Minister in November 2022, indicating the likelihood that their councils soon will be forced into bankruptcy: "The problem is simple: the additional money that we can raise from council tax and business rates barely covers the normal inflationary pressures that we face each year. This leaves significant growth, particularly in adults' and children's social care, totally unfunded" (Butler, 2022).

By 2021 Hampshire County Council had introduced care technology into over 13,000 private homes. One of their technology partners, PA Consulting, estimates that this saves Hampshire on average £2 million a year: "After all the costs of the contract are paid for (that's our time, the kit, the installation, the maintenance, the monitoring, the retrieval of the kit, the recycling) … You take all of that, and you take that off the gross savings, which is what has been avoided by giving somebody care technology, instead of dom-care or instead of rushing them into resi-care when they didn't need to go, then the net result is a £2 million pound saving a year. So we've saved them I think about £15 million pounds over the over the seven years of the contract so far." The technology is streamlined to the user needs; that is, the kits that are installed differ from home to home. Technology ranges from something as simple as medication dispensers to installing motions sensors, GPS trackers and/or an ECHO system to access Alexa. Hampshire is also working with PA Consulting to introduce cobots to assist caregivers lifting and moving those in need of care. These exoskeleton cobots allow the city authority to reduce labour costs by stripping back, where appropriate, the need for what is called 'double-up care'.[5] This refers to allocating two carers to visit a home to lift a patient to ensure that the lifting is done safely. Weighing the costs of renting cobots or exoskeletons against labour savings, the intention (at time of interview in June 2021) was to deploy 728 exoskeletons by the end of 2023. Hampshire also worked with PA Consulting and Amazon to develop an automated call system to monitor residents during the pandemic. This system is described as a "human-replicating experience" and used Amazon Web Services' Connect to

[5] For a 2019 PA Consulting and Hampshire Country Council conference demonstration of their exoskeleton cobot, see https://www.youtube.com/watch?v=KYPIrsKbDfs.

make outbound bot calls to roughly 200,000 people in Hampshire.[6] Robots were calling to initiate a conversation about residents' wellbeing.

The Hampshire local authority is considered to be at the forefront of introducing technology for adult social care in the UK. The authority credits their capacity for innovate to some decisions that they made early on. First, they recognised that they were not tech experts. Second, they wanted what they call a true partnership with a tech partner. To that end, their partnership with PA Consulting in particular has gone beyond a contractor-contractee relationship. Hampshire ceded some management responsibilities to PA Consultants, giving them the responsibility of managing staff training and staff tech referrals for service. They brought consulting firm staff into their office. The Head of Commissioning for Hampshire local council explains that they said to PA Consulting, "'Right, sit there and work there'. They've gotten computers and IDs and all the rest of it. I just did it and nobody stopped me. They've got our system to Hampshire County Council. They got log-ins into our system, they sit in our offices. They use our equipment. They are there for anybody to talk to. So I just brought them in and made them part of what we do […] It's probably not textbook by any stretch. But it seems to work." The productivity of this close relationship is evident from the story of how Hampshire came to introduce cobots. The idea came to Hampshire local government during a social evening at PA Consulting's office in Central London: "Someone [from PA Consulting] said 'Why aren't you looking at co-bots then?' slightly jokingly. Everyone [from the local authority] went away, and about a week or so later it was: 'Shall we?'".

Hampshire sees the potential for the digital to become "the bridge between care and health" allowing people to "take control and manage on their own". "Rather than being providers of technology", local authority service providers say that they have become "curators of services," which allow residents to live on their own. This reimagining of local government's role in care in Hampshire – from provider to curator – is significant given Hampshire's leadership and size. The council has won many awards for their innovative use of technology and credits their capacity to innovate – in part – to the fact that they are one of the largest local authorities in the UK. They have the budget that both allows and demands innovation: "it has occurred to me in the course of conversations [with smaller authorities] that our savings target was bigger than their budget.".

Commissioning managers from other local authorities also mentioned the timing of Hampshire's relationship with PA. The commissioning manager from the largest council in the UK observed: "You've got the likes of Hampshire in the UK. […] It's got a really good partnership working with PA and is deploying lots of different bits of kit. But the model that works for them, I don't know if it would work for Birmingham because we're all such different beasts. I went down to Hampshire to see how that was working and it is a really collaborative style." "But," she noted, "it was before money became an issue in adult social care. They got it up and running before everything kind of hit, and we had reduction after reduction after reduction. We're kind of on the backfoot with it. […] Whereas they've proved it will work in most instances for them, and they've prepared for the prevention bit to be a bit more costly to save them on the crisis bit.".

Underlining the extent of experimentation by local governments, along with the fragmented nature of this innovation landscape, the commissioning manager from Birmingham also found it difficult to emulate Hampshire because of past failures within their local authority. In line with Muzzucato's observation that "downstream" investments in particular technologies carry a fair share of risk, the commissioning manager from Birmingham reasoned that "our management is a bit more hesitant around that, and quite rightly so, because part of our legacy knowledge is that we had quite a big telecare contract with a big provider in the UK, and it wasn't the best for a number of reasons. And when I came into adult social care in 2016 one of the first things I was asked to do was decommission that contract. So, with us, we've got legacy negativity around technology, whereas Hampshire never had that. So, they've moved forward quite positive. Whereas what I'm trying to say is 'It's not going to be like this again.' But that's where a lot of the reluctance comes from. I mean, that's the trouble with councils. Some have really good experiences. Some not so good. And then trying to move [the latter] forward in that second round is quite difficult, as I'm finding out.".

The awards received by Hampshire for its use of technology for adult social care have served their partner tech companies, and working with local authorities is important to market expansion. PA Consulting is a large global professional services firm that noticed over a decade ago during "financial sustainability reviews" that almost no local authorities were using technology to provide adult social care. PA began to move into this space, starting "just on an advisory basis" with "two or three authorities" including Hampshire. Working with Hampshire since 2013, assessing needs and providing and installing technology in people's homes, "we've won lots of awards, got lots of applauds, got lots of attention, attracted lots of attention from other local authorities, from national government. We've had the Norwegian government and health director over looking at what we do. Scottish government. Northern Ireland. We've subsequently delivered the same service in Barnet, Dorset, part of Essex." They have worked with about 25 other local authorities "doing diagnostic reviews, service designs, business cases, and helping them get into a position where they can achieve the same things.".

Working with local authorities has not only been a way of expanding markets; it has been key to product development. In the initial collaboration, PA was hired on an advisory basis to provide advice. At the end of the advisory "exercise" PA Consulting bid to actually deliver care technology: "And we got together a couple of organisations who we'd come across in our previous work […] and created [in 2013] something called Argenti, which is just a trading name for our work in the care technology space." Product consultancy and development is integral to the corporate model of the PA Consulting Group, which, in 2000 launched PA Group Ventures as the means through which to capitalise the ideas and products initiated in its consultancy work.[7] In 2005, PA was lauded by the *Financial Times* for its "highly successful" model, noting how "consultancies should be a good role model for corporate venturing" (Baxter, 2005). As one of its several subsidiary companies, Argenti Care Technology was formed with the aim of product development with local city councils in the UK, to provide "advanced automated support", delivering and assembling the technology kits (sensors, monitors, GPS, Alexa, etc) to support people continuing to live independently in their homes. Argenti claims to have delivered 30 million pounds in net financial benefits for its clients, supported 40,000 people in the UK, and trained and certified more than 4,000 health and social care practitioners.[8]

In terms of cobots, the Hampshire representative with whom we spoke observed that much of the cobot technology is developed within the defence sector. With PA, they could identify only four or five

[6] https://www.wired.co.uk/bc/article/what-leaders-can-learn-from-tech-transforming-healthcare. Hampshire local authority is working with other tech companies and products, for instance, with Oysta Technology (which makes wearable devices) has worked with Hampshire for the last 8 years (Interview with Oysta).

[7] Since its inception in war-time England in 1943, PA has focused on technological development; its products include the first self-servicing parking system, digital telephone exchange, recordable compact discs, the disposable pregnancy tests, EV charging ports, remote controlled military ground radar (used to locate IEDs), and more.

[8] See https://www.paconsulting.com/industries/health/argenti-care-technology.

producers of exoskeletons worldwide with whom they could work, and only one, the Japanese firm Cyberdyne, that really "came forward" to work with them. The council first entered a trial phase, giving the co-bots to workers to wear to see how useful they are for different tasks of delivering care. On the basis of this feedback, they have now signed a contract to lease the exoskeleton devices. They are "working very closely [with Cyberdyne and PA] to develop the product." Of mutual benefit no doubt, this is also a case of public-sector investment in private-sector product development, with (potential) profit-making returns running alongside public sector savings. The Cyberdyne co-bot collaboration figures prominently in the PA Consulting website.

The partnership with Amazon through PA Consulting raises the same and additional issues. Amazon AI Backend was an active participant in the Wellbeing Automated Call System developed in Hampshire during COVID. Amazon awarded PA Consulting and the call system the "Most valuable Amazon Connect deployment" award in 2021. The local authority representative with whom we spoke observed in relation to this award: "Amazon is really interesting, because they don't tell you they are listening". The award was evidence that Amazon was clearly listening to developments in Hampshire with a great deal of interest. This was clear as well when Hampshire was developing a project to utilise Alexa to provide a reminder service: it allows people caring for someone to leave reminders that can be accessed by other care providers and/or the individual in need of care. Hampshire was in conversation with Amazon at the time they were developing this system: "Clearly Amazon was listening because one day, whilst we were in the process of developing this, [we found out] they'd done it and released it worldwide. They didn't tell us. It was like, 'Okay we just wasted money paying developers to put this together and you've done this.'" A further concern is that much of the tech deployed in people's homes by PA Consulting requires that they sign up for an Amazon account, which raises concerns about Amazon's access to personal data. Hampshire local authority representative observed: "In terms of Amazon, we're like the nap on the back of the neck on the back of the cow in the field type of thing." And yet, the local authority – one of the largest in the UK (and a leader among local authorities in the use of tech) – has facilitated the entry of many residents in the region into this vast field of Amazon services and surveillance (see Ebeling, 2022; Zuboff, 2019; Shulevitz, 2018; West, 2019). Hampshire local authority is aware of the issue: "If we give someone one of these things, they are signing up to an Amazon account, and then there's a whole issue around transfer of data and stuff like that. People need to understand what they are signing up to, that […] all that data may be processed anywhere. So we couldn't give it to them and have it on our accounts because we couldn't guarantee where the data is going. We do have other things that do similar sorts of things." And yet Alexa remains within the repertoire of options.[9]

3. Sunderland/Solcom

At the other end of the country, in the north of England, Sunderland City Council is also widely recognised within the UK as innovating technological solutions to providing adult social care. One of the Sunderland representatives with whom we spoke attributed their leadership in this area (in part) to the high level of need in the Northeast of England. Lower incomes and histories of working in coal and chemical industries mean that "people have long-term lung conditions, or cancers, or mobility issues. So, we probably have had to react a little bit quicker." Added to this is Sunderland City Council's commitment to its Smart City Initiative,[10] as well as the Great North Care Records program, which links GP health and social care records of 3.6 million people in the region, with the exception of individual residents who have opted out.[11] High reliance on (shrinking) central government funding in the North of England is no doubt another factor (Gray and Barford, 2018).

Sunderland has partnered with Solcom to develop a home monitoring system and app called SHEILA (the Social Health Enabling Independent Living App) that allows family and informal and/or formal care networks to monitor an older person's activity in their home. Passive infrared motion detectors, pressure pads, door sensors, GPS tracker and the like are installed to monitor movement, the opening and closing of doors and the refrigerator, the use of the tea kettle, etc. This can be linked to Alexa to allow automated voice instructions (e.g., if a front door is opened at night, a voice message is activated: 'Mum, It's late. Come back inside'.) If the GPS tracker is being used, there can be 'no-go zones': "So if they've gone beyond a certain distance from a home" those monitoring the system can be notified. The plan is to have SHEILA installed in 1500 homes within the next couple of years. Solcom has also worked with Sunderland to develop an all-in-one 'BlueBox' telehealth toolkit that care professionals and family members can use to monitor vital signs (e.g., heart rate, blood pressure, temperature, blood oxygen saturation levels). This information is fed into a simple algorithm to calculate a national early warning (NEW) score to determine whether further action is (or is not) required. Solcom estimates that the Blue Box is used to monitor the health of 70,000 people throughout the UK. They reckon they now have "10 years' worth of health data, built up over time.".

Sunderland has carefully assessed the savings made possible through the deployment of technology. The Solcom representative reported that the Sunderland Council "did a pilot of [SHEILA in] 100 homes, where they demonstrated on a scale up to 1500 homes they could save £4 million annually in care services […] They demonstrated that a person with early-stage dementia and perhaps a bit of frailty managed to stay in their own home for six months longer before they ended up in a care home." He ventured: "And we've produced stuff that they want, and they've won awards. They got Smart City of the Year award, they got Digital City of the Year, they won some Harvard awards for their tech. So, it's kind of nice and rewarding for us. And they see us as a kind of, very key partner." "They're quite happy to share the savings that they make, and the case studies. So you know they're quite good for us to share those around. And they're kind of indisputable really.".

Indeed, the association with Sunderland has been important to Solcom's business development and profitability. As is the case with a number of tech companies we interviewed, Solcom's entry into health care was a somewhat opportunistic response to a NHS funding round for innovation. Solcom started in 1998 by creating a software product that could be used to monitor networks, in their case, photocopier networks: "we created a product that could go onto a PC on the network, and it could explore the network, find among other things Canon photocopiers and extract data from them." When cloud computing was developed, the company developed a platform called Whzan, created to put industrial

[9] Further fuller consideration of the ethical dilemmas opened by local authorities facilitating the access of Big Tech (and other smaller private technology companies) to people's behavioural and care data falls outside the parameters of this paper. We recognise that Alexa (the AI service), Amazon Echo (physical devices) and other such devices and services are especially concerning; they represent the proliferating monitoring technologies colonising their way into the most intimate spaces and patterns of our daily lives. For Zuboff (2019), such technologies have ushered in a new economic imperative representing a distinct stage in the trajectory of capitalism; the extraction of our experience as data by Big Tech (Amazon, Google, Microsoft) and its commodification lie at the heart of a new global apparatus in which human behaviour is the new raw material. At the same time, cheap off the shelf, readily delivered to your door, Amazon and other devices can offer affordable and viable options for local authorities and care workers working within substantive budgetary pressures.

[10] See https://www.sunderlandoursmartcity.com/.

[11] The default option is to be opted in. Eleven NHS Health Trusts, 13 Local Authorities and 8 Clinical Commissioning groups (representing all GP practices in their areas) are collaborating on this consolidation of health and care records. Sunderland local authority and commissioning group have signed on.

data onto a cloud platform to remotely monitor systems. When the NHS funding round was announced, the creator of Whazan thought "I could do something monitoring people's health." They used the grant to produce a forerunner to the Blue Box technology. Subsequently they were unable to navigate the NHS tendering process to further develop and implement the use of this technology. "When you've got new innovation, you can't [provide three reference sites where the technology has been used]. And the NHS just cut us free. Just, you know: 'Thank you very much. You've won an award. Here's the grant money. That looks really great.' And that was the end of it." Working with Sunderland local authority allowed Solcom to further develop the product and build the market for it, re-engineering Whzan to address needs identified in part by the Sunderland authority: "They managed to get a huge amount done for a very small budget because we had the platform and its tailored software rather than starting from scratch. And we've been working with them ever since, on shared ideas." The company opened an office in Sunderland "to show a bit of support for the city." The company has now dropped all of its other activities and focuses exclusively on Whzan. "And we're growing exponentially, growing that by about 80 % per year." It has been able to reengage with the NHS, but equally they are expanding SHEILA into other local authorities (a system called 'Guardian' outside Sunderland). Their assessment is that "stuff that we're doing for the councils would be ripe for private [use]". Solcom does not yet have the facility to market to these customers. Their model is a business-to-business marketing strategy. They are however preparing to move outside the UK, into Scandinavia and the United States. They are currently looking to apply the Blue Box technology to clinical trials: "We're talking to clinical trials companies, and they invariably are international. So I hope we'll be international before long.".

The economization of life through a discourse of savings on the part of local councils and risk and private investment on the part of private enterprise runs through the Solcom executive's narrative. Sunderland "paid us what was originally quoted and Solcom has supplemented the development with the knowledge we can deploy this elsewhere. The councils aren't interested in selling it themselves but they are interested in working with us, and perhaps with us working with other councils." Solcom has given a free app to the NHS "because it's easier to get them on board if there is no commercial contracting." This form of subsidization "makes it easier to penetrate these organisations. And once you get the trust of one, [he] then tells his neighbours: 'If you work with them, you'll get the results you need, and you won't get ripped off.'" He estimates that Solcom has invested about £50,000 worth of time with another local authority, "really just to get [local authority] on board." "We've got a positive balance sheet, so we can afford to take the risk." Savings, investments and risks are discursively ordered in predictable ways that fail to cost out or value the risk and investments on the part of local authorities. It is worth noting that Sunderland has been a partner in the development of the technology, with public sector workers also spending their time in product development and implementation. Working with Sunderland has been a critical step in Solcom's market expansion. So too, some of the risks borne by local authorities are not easily monetized. From an occupational therapist who is tasked to introduce technology in Sunderland, these include a complex assessment of risks to personal liberty, including the interplay between technology and the Mental Capacity Act when using technology that can also function for purposes of surveillance. She spoke of the "anxiety that you're going to get something wrong." These immediate costs are difficult to measure, but anxiety and responsibility for a swath of individuals' liberty are costs and substantial risks nonetheless.

4. Wolverhampton/Worcestershire/PredictX

PredictX is a small to medium sized technology company that "leverages" AI to help "public sector and blue-chip institutions to make decisions better by deploying Machine Learning techniques", mostly by integrating different systems of data (https://startup.info/ayesha-shah-predictx). Started in 2012, its creator claims it is one of the only companies in 'the AI space' not reliant on venture capital. Instead, the company's growth has been "bootstrapped from reinvested earnings," an estimated 40% of annual turnover. Like other tech companies we interviewed, PredictX works across diverse sectors, in the case of PredictX: insurance to business travel to procurement to retail to the "care and health space." A representative of PredictX told us that all of the "product line" in the care and health space is focused in UK "and that's purely because of the target market that we've had," which has been to integrate health [NHS] and social care systems [the statutory responsibility of local authorities]." We interviewed representatives of two local authorities in the Midlands of England that have worked with PredictX: Wolverhampton and Worcestershire.

In line with the notion of the entrepreneurial state, a representative of PredictX stated that: "What is wonderful about this relationship [with a local authority] is that they know how to ask questions". Local authorities have also been successful securing grants from NHS Digital to partner with PredictX. In the case of Wolverhampton, PredictX has integrated individuals' (pseudonymised) NHS numbers with their social care record data to better understand the relationship between social care and health services. The first phase involved predicting people's journey from A&E into hospital and then out of hospital. Demonstrating that "the data science was sound" allowed Wolverhampton to apply for another round of funding to use AI to create people profiles: seven have been identified. The ambition is to use these profiles "to tinker about with a particular type of service in a particular neighbourhood with a particular group of people to see if that could have an impact on, let's just say, reducing attendance at hospitals and also delay people's eventual admission into residential care." In the words of a PredictX manager: "What we produced was a set of profiles that looked at more than just health conditions and social care packages. It looked at costs, and touch points, and all the rest of it." Economizing on the expense of hospital admissions and delaying reliance on residential care is key.

In Worcestershire, PredictX has partnered to analyse the assistive technologies installed in residents' homes to better understand whether a call-in response to the use of the technology (a beeper) would reduce the need for other services. The representative of PredictX told us that "we are seeing how many times each of the patients is utilizing his assistive technology interface that he has been given. You can see if there is anxiety building up [when a patient "clicks, clicks, clicks"]. And when there is anxiety building up, this may lead to an event." The event of prime interest is a costly trip to an A&E facility. With new and immediate demands posed by the pandemic, this project was put on hold. Up this point, 3,000 people were enrolled and preparations were in place to invite another 10,000 individuals to opt into the data monitoring study. The ultimate goal is to try to predict an event (e.g., a fall or urinary tract infection) before it occurs in order to prevent a costly trip to the A&E or a level of care that necessitates moving from independent living into a residential care facility. From the perspective of a manager at PredictX: "So, you can look at the cost of the admission to hospital, and you can say, 'Right, okay, for this thousand people that have fallen in the last twelve months, that's cost us a million pounds', whatever it may be. What's often missed is then the resulting impact on other service providers once they leave hospital." A pattern PredictX regularly detects is a spike in social care after the hospital visit. He reasoned that this analysis makes the case for implementing a falls prevention program and delivers up a reallocated budget: "We can get an average pro-rated cost of… 'Right, actually the cost to the health sector is 33 % and the cost to the social care sector is 66 %. So this is how we're going to break down the budget in terms of how we're going to get the money to put [a falls prevention program] in place'." Given the history of social care cutbacks, this is possibly an optimistic predicted outcome. It does speak to faith in quantification as a means of policy development and budget allocation.

5. Trials, quantification and magical thinking

What representatives of local government and technology firms describe is a fragmented landscape of technological solutions to adult social care, one local authority at a time. Successes incubated in one local authority are pitched by technology firms to other local authorities to expand their market reach, and by tech companies and local governments to the NHS for funding. The process is described by a Quality Assessment manager who is part of the 'Commissioning and Quality Assurance Team' of a local government in the London area:

> We applied for some funding [to work with the company Docobo to introduce technology to monitor health at care homes] and we were successful with our funding. I've been working on [that project] for over two years now. So we made a bid for some funding to NHS Digital, some development funding, and then some implementation funding. And we were successful with both. And then after that funding has run out, which was April this year, we were successful with some to NHSX funding to continue the project further.

The pressure to secure this funding is palpable. She noted the fortuitous timing of their process, and judged that cuts since securing their initial funding would have preventing them from testing assistive technologies. "We're always having to look at how we can make solutions that are self-funding. So how we can generate enough income so that they pay for themselves. I think if you haven't got the staff resources to spend the time to do the market research, to do the market development, it's easy not to be able to deliver anything above and beyond [statutorily required services].".

Quantification and trials are key to securing funding. Options are shaped and constrained by what can be quantified and costed. The Quality Assurance manager quoted above noted the especial difficulty of "promoting services and solution support" when the return on investment is not easily quantifiable. She made a distinction between cost avoidance and cost saving, with the former less easy to quantify and thus more challenging to find support from local council. She opens the black box that the representative from PredictX (quoted above) had smoothed over with such confidence and certainty by pointing to the difficulty of quantifying whether assistive technologies can "help perhaps avoid falls or to get a quicker response following the fall, which is then going to mean they're not going to have hospital admission". She relied on the Health Innovation Network (part of the Academic Health Science Network for south London) to do quantitative and qualitative evaluations to support this claim: "that really helped us when we were bidding on the next round of funding." This reliance on university researchers to demonstrate efficacy is very common and another vector of state support for product and market development. (Indeed, the role of university researchers in this process may have been one reasons that local authority and industry representatives were so willing to speak to us.).

The difficulty of quantifying the savings of cost avoidance and the 'soft' qualitative data that sometimes sits behind what is considered to be harder quantified evidence was also mentioned by a project manager in Worcestershire in relation to the assistive technologies they are introducing into private homes: "It doesn't save money that's already spent but it does delay future spending, which is always very hard to measure because you don't quite know what and when you would have spent stuff. For the sake of the pilot, what we did was we got social workers to guesstimate what they would have put in place had they not have" installed assistive technology.

The project manager for the Wolverhampton Adult Services Program was also clear about the challenges (and necessity) of demonstrating cost savings to secure the funding for implementing their project with PredictX. They have to provide evidence "that it provides better outcomes for people who get the service. That can mean remaining independent for longer with less support." The NHS program that had funded their innovation over three years has now ended. During those three years, the funding came in steps: first step was to develop a prototype, a second was to demonstrate its potential. Demonstrating efficacy and cost savings to garner support from local council has been difficult in the short time frame demanded by local council: "It's not something you can do within six months to twelve months." The Wolverhampton Adult Services Transformation Program must now seek funds from NHSX (now the Transformation Directorate), and this too requires evidence that is difficult to produce: "getting that money is a very competitive process. And we don't think we are quite close enough to be able to convince NHSX that we've got a product that's ready to be rolled out nationally.".

A representative of Oysta Technology complained about the culture of trials within local authorities, which are no doubt necessitated by funding requirements. "The local authorities told us we need to do a trial. I say, 'C'mon guys, it's been used for the last 13 years […] There seems to be a tendency of 'We must trial something' and then when they do trial it, they don't really know what they're trialling, if I'm honest." He described a trial he was shown that tracked the efficacy of technology in the home after hospital discharges. "So I sat there with everybody in the room, OTs, nurses, and they showed me [the results of the trial]. They said: 'This is the technology we used. Can you mirror this?' I said, 'I can. But what's it telling you? […] I see a graph, a few graphs, with some lines on it. I felt it was very weak." And yet Oysta Technology cites a trial by Camden Council on their website: "Camden Council, in partnership with Oysta, has successfully piloted a care tech device to allow residents to return from the hospital sooner and be fully supported to recover at home," claiming that patients using the device return home three days sooner.

A manager employed by Anthropos Digital Care, which also installs and monitors sensors in homes, was more inclined towards trials if done at the appropriate scale:

> The biggest challenge for everybody who works in this space is, there is no evidence that this kind of technology-enabled care works at scale to produce the outcomes that everybody wants. Now I have tonnes of anecdotal evidence. What I don't have is robust, academically qualified, business case ROI [return on investment] cost-benefit analysis that either the government or local government could look at, and say, 'There's the case. If I spend X, I'll save Y. And Y is 5X or 6X, so it's worth me spending it.' So, nobody—anywhere in the world—no one has produced that evidence that it can be done.

The problem in his view is the lack of research funding: "We are funding, with partners, smaller scale studies that we will take to government, that allows us to say, "We've proved it on a smaller scale. But you need to fund the £million study—that runs over 200 people, over 12 months—that proves that there's an ROI for this. It's very frustrating." Asked why 200 over 12 months is the scale that provides the evidence to convince, he responded:

> For the NHS to accept it, they look for cost-benefit analysis. That is kind of a minimum: 200 people who are using your equipment and your platform, and another 200 who are in a control group. So that you can genuinely say, 'We prevented 38 % of the potential falls.' Because you're asking people to measure the value in terms of things that haven't happened. All they're used to measuring is the things that they have paid for. Local authorities and NHS pay for time and task: 'I gave you money. You delivered an hour of care.' What they're not used to paying for is, 'I paid for this equipment. It avoided a fall in six months' time.' It's a very hard argument to make with them, until we as an industry or individual companies can produce that kind of cost-benefit analysis, that compares the people on the platform against population size data—if it exists—that says, 'We would expect everybody over 80 to fall at least once a year. All the people on the platform, of all of those, 38 % of them did not experience a fall.'

We pressed about the basis for the numbers and the simple response was: "We can't get past NHS people until we do this. Because no matter which one we've spoken to over a three-year period, they all say, 'Have

you done, like, a 200-person study, over 12 months, 24 months?'" We note with interest this entrepreneur's frustration that a £1,000,000 study has not been funded (presumably with public funds) that would establish the evidence that would firm up the market for his product.

Our skepticism about quantification need not imply a skepticism about the efficacy of technology in the social care sector. We have outlined the labour that those responsible for social care expend to secure public funds to develop and test technologies, which tech companies then use to develop their product and extend their market reach. As striking is the extent to which a trust in numbers (Porter, 1995) structures and rationalises government allocation decisions, even when the numbers are guesstimates grounded in lived experience. Poking at the objectivity of the cost-benefit analyses used to make policy determinations opens space for politics and a discussion of a wider range of policy alternatives, including a discussion of the relative benefits of investing 100s of millions pounds[12] in digital transformation as opposed to investing in care labour.

6. The entrepreneurial state and re-valuing care work

We are in a moment of tremendous experimentation innovating technological solutions to a crisis in adult social care. This is not necessarily bad and some with whom we spoke held wider ambitions than the reduction of costs. The manager of occupational therapy at Sunderland, for instance, leavened savings with other ambitions: "We are very keen to demonstrate that we're pursuing technology-enabled care because we think it has value in the care arena and not because we think there's financial savings." "Though," she added, "that [prospect of savings] outweighs everything else." A tech representative rightly noted that it is unfair to compare technological solutions to a non-existent ideal.

> Yes, of course it's not ideal that somebody has a medication carousel that beeps at 12o'clock to tell them they need their medication. It would be much better if they lived with their children and were cared for 24/7 by a wholly extended family [in a] loving kind of way. But that's not the reality. Nor is it the reality that you can actually send somebody in who has the time to chat to that person, and say 'How are you getting on Mrs. Jones?'. The reality is the alternative is nothing. Or somebody in a pinny running in for five minutes, throwing a pill into a paper cup. And watching Mrs. Jones take it. And then running out the door.

He articulates a world of crisis without alternatives beyond the automation of care. But other standards of care are possible now and did exist in the past (Molinari and Pratt, 2023). (But see Lorne, forthcoming, on the risks of nostalgia for an NHS of the past.) The precarious care worker in the pinny dashing from home to home is a product of years of cuts to the funding of social care. Decades of austerity have reconfigured the baseline within the decision-making environment by creating the conditions of existence that make automation the preferred or even the only solution.

It is clear that new technologies are supporting altered norms of care and raising concerns about privacy and surveillance. More responsibility for care is being shifted to informal carers or the person in need of care. The state is redefining its role: from care provider to curator of service options. Individuals' data is being shared. So too, innovation in taking place within a well-defined and limited imaginative geography: the preoccupation is to keep people in their homes for as long as possible, out of expensive alternatives such as A&E facilities, hospitals and long-term care facilities. Community and other living arrangements are rarely mentioned. Basic questions of what is causing the scarcity of care workers are too seldom asked and budgetary constraints make it extremely difficult to address labour conditions in social care sector. In Fraser's framing of structural ethical critique, the possibilities of collective self-determination are being or have been foreclosed.

Although tech companies often frame their collaboration with local authorities through the language of largesse (e.g., giving technology and labour time away for free), local authorities are innovators and incubators for product development, simultaneously paying for the opportunity to perform this role. Local authorities come up with the questions, write grants to seed projects, write more grants to trial the projects, and absorb the risk of implementation. The results of these trials are then used by companies to pitch their products to other local authorities and – what one tech manager referred to as the holy grail – commissioning officers with the NHS. Global health markets are within their sights. If this entrepreneurial role of the local state is recognised, at the very least, the justification is in place to require more 'free' goods and services from tech companies. This returns us to Mazzucato's (2017; 2022) argument that there is a clear case for socialising profits for the kinds of downstream investments that local authorities are making through procurement.

What to do with these socialised profits? We want to return to the suggestion of the manager of PredictX who laid out a plan for distributing the costs and savings of instituting a falls prevention program by installing monitoring technology in the home. He reasoned that if the savings of falls is 33 % to the NHS and 66 % to social care, these should be reflected in budgets in these proportions (presumably with a transfer from NHS to local government to pay for the falls prevention program). We hold out for redistribution that recognises the worth of those who will continue to do the work of care alongside automation. Virtually everyone with whom we spoke was clear that machines will never replace human care providers. We push on current optimism about the benefits of technology to insist that the promised savings address the labour crisis and the persistent undervaluing of the labour of care. In her book, *The Economization of Life*, Murphy asks: "How does capitalism know and dream its own conditions though numbers and data?" She asks us to question whether population and economy' are "adequate analytic containers for assembling life towards other futures?" She wonders, "What would it take to smash the container?" (2017, 001). Neither techno-optimists or skeptics, we urge this moment as an opportunity to smash the analytical container and recover the worth of the labour of care – so often partitioned, hidden and undervalued as life beyond capitalist economies.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

[12] For instance, we query the November 2023 decision by the UK government to award a £330 million pound contract to Palantir, the US technology and analytics company with a long history of work for military and intelligence agencies in the US, UK (and beyond). Palantir has been contracted to build a 'federated' data platform in which every hospital trust and integrated care system across the UK will (in theory) be able to connect and share health and care data.

Data availability

The authors do not have permission to share data.

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