Theme Issue Article

A Economy and Space

EPA: Economy and Space
2024, Vol. 56(1) 330–345

DOI: 10.1177/0308518X211022366
journals.sagepub.com/home/epn
SAGE

More work for Big Mother: Revaluing care and control in smart homes

Jathan Sadowski
Emerging Technologies Research Lab, Faculty of Information Technology, Monash University, Australia

Yolande Strengers
Emerging Technologies Research Lab, Faculty of Information Technology, Monash University, Australia

Jenny Kennedy
School of Media and Communication, RMIT University, Australia

Abstract

The home is an ever-changing assemblage of technologies that shapes the organisation and division of housework and supports certain models of what that work entails, who does it and for what purposes. This paper analyses core tensions arising through the ways smart homes are embedding logics of digital capitalism into home life and labour. As a critical way of understanding these techno-political shifts in the means of social reproduction, we advance the concept of Big Mother – a system that, under the guise of maternal care, seeks to manage, monitor and marketise domestic spaces and practices. We identify three tensions arising in the relationships between care and control as they are mediated through the Big Mother system: (a) outsourcing autonomy through enhanced control and choice, (b) increased monitoring for efficient management and (c) revaluation of care through optimisation of housework. For each area, we explore how emerging technological capacities promise to enhance our abilities to care for our homes, families and selves. Yet, at the same time, these innovations also empower Big Mother to enrol people into new techniques of surveillance, new forms of automation and new markets of data. Our purpose in this paper is to push back against the influential ideas of smart homes based on luxury surveillance and caring systems by showing that they exist in constant relation with a supposedly antithetical version of the smart home represented by Big Mother.

Keywords

Smart home, digital capitalism, social reproduction, feminism, marketisation

Corresponding author:
Jathan Sadowski, Emerging Technologies Research Lab, Faculty of Information Technology, Monash University, Caulfield East, Victoria, Australia.
Email: Jathan.Sadowski@monash.edu

Introduction

> If asked, would you say that a house is a machine, a tool, a piece of clothing, a skeletal extension, a work of art, a statement, a sculpture, an engine, an invention, a living organism, a virtual being, a respite, a cybernetic system, a vessel, a shrine, an object of veneration, a document, a discourse, a castle, a coat rack, a refuge, a nightmare, the centerpiece of male dominated capitalist culture, a home? (Gold, 1995: 384)

This paper outlines a new technological shift taking hold in homes now and its effects on the labours of social reproduction, from the pastoral to the industrial to the digital and from hired servants to domestic appliances to smart assistants. The home is more than just a space where domestic and care work takes place. It is also an ever-changing assemblage of technologies that shapes the organisation and division of housework and supports certain models of what that work entails, who does it and for what purposes. The home is, in short, best understood as a means for social reproduction. It is not a static technology. Like other modes of production, the home is subject to constant change based on broader cultural, economic and material conditions. The home is also a politicised unit of analysis. A historical focus on the heteronormative familial structure as the dominant form – perpetuated in much of the marketing material on the smart home – serves to make invisible other contemporary household structures. Based on our analysis of the 'smart home' now emerging within digital capitalism, we argue that the integration of data-driven, networked and automated systems into homes is giving rise to new tensions between practices of care and control, which are linked to new forms of managing, monitoring and marketising 'life's work' (Mitchell et al., 2003).

In *More Work for Mother*, technology historian Ruth Schwartz Cowan (1983) traces an important transition in the organisation of domestic labour as households became industrialised. The pastoral family relied on manual labour from servants, children and hired hands to help do the job of maintaining a household. The centrality of external help is apparent in Cowan's analysis; access to domestic labour, particularly prior to the 20th century, was not only restricted to the wealthy. While having full-time domestic servants was a solidly middle- and upper-class privilege, 'many more households, ranging fairly far down the economic ladder, have employed domestic servants seasonally, occasionally on a part-time basis' (Cowan, 1983: 119). As new technologies entered the household, with its strict gendered division of labour, they tended to assist in easing the burden of men's work while preserving or increasing women's work by reducing the household's dependence on hired help. A catalogue of modern domestic innovations reduced the need for domestic servants and child apprentices for hard jobs such as cooking and cleaning.

With industrial expansion, the replacement of domestic hired help came with new opportunities for work outside the household and a rise in the cost of labour power. The industrial family saw the role of the housewife in a heteronormative nuclear family change: before, the housewife might have overseen the domestic duties of others, and perhaps taken up the more skilled or careful tasks for herself. Instead, equipped with the right tools, even women positioned in the upper professional classes are now expected to take on the work once done by multiple people – albeit with the help of modern technology. In other words, these changing material conditions meant the manager of the home was a position reserved for women, while men remained masters of the house. Devices such as vacuum cleaners and washing machines were sold as ways to reduce the amount of work required to maintain households. Yet, as Cowan shows, rather than enjoying a life of leisure and convenience, many women struggled to fulfil new duties on their own, while also keeping up with greater standards for how well they cared for their families and homes. In short, we can summarise Cowan's analysis of this technical and economic transition in social reproduction with three general points: work was reduced for men but did not substantially decrease for women, work previously delegated to servants fell onto the housewife and work previously outsourced to commercial services came back into home.

Playing on Cowan's (1983) book title and her conclusion that the industrial revolution of the home created more work for 'mother', we propose that the digital revolution of the home is creating more work for 'Big Mother'. Strengers and Kennedy (2020) employ this term to refer to a system that seeks to enact a commodifiable digital surveillance of the home under the guise of maternal care. We analyse the changing labour dynamics arising under a Big Mother regime through feminist theories of techno-politics and social reproduction and argue that the integration of digital devices into spaces and practices of care and control are also marketised logics that contribute to the revaluing of their associated labours in the (smart) home.

In the next section, we outline influential visions of the smart home and advance Big Mother as a critical concept for understanding these techno-political developments. We then identify three areas where tension occurs in the relationships and revaluations between care and control through the Big Mother system: (a) outsourcing autonomy through enhanced control and choice, (b) increased monitoring for efficient management and (c) revaluation of care through optimisation of housework. Each section begins by outlining the promise of some new technological capacity to better care for our homes/families/selves. We explain how these innovations also empower the regime of Big Mother to enrol people in new markets and techniques of surveillance. Each focus area highlights important tensions where the promises foretold in smart home narratives generate disparate outcomes when these technologies are incorporated into people's lives.

By mapping out these tensions, we offer an original analysis of the smart home that contributes to the feminist political economy literature on digital technology. Nascent work on the nexus of smart homes and digital capitalism (e.g. Goulden, 2021; Maalsen and Sadowski, 2019) has begun critically exploring these innovations and their implications, primarily through the literature on surveillance and media studies. Our paper contributes to this work by theorising the rise of smart home technologies, both still emerging and now ubiquitous, in terms of social reproduction and the concept of Big Mother. This theoretical framing allows us to better understand the changing, and contradictory, socio-technical relationships between care and control in the home, while also situating these changes within the broader development of domestic spaces, labour and technologies. Our key contribution is a conceptual analysis of the tensions arising under a Big Mother regime that seeks to marketise and colonise the home by delivering feminised technologies and by promising to take up feminised labours.

As we will show, there are no strict boundaries between how these three tensions play out in the home. Technological processes of control, management and optimisation all exist relationally with each other; systems meant to enact one typically also involve the others in some way. That is not to say the divisions between these three tensions are purely an analytical construct. While there is overlap in our analysis, each tension highlights important operations and outcomes of the smart home that would benefit from further exploration in empirical research with diverse households that break out of the heteronormative paradigm that so many smart home narratives are constructed within. Finally, rather than allowing Big Mother to serve as the platform for social reproduction, we conclude by considering how, as smart technologies become ubiquitous features of the home, we have the opportunity to reevaluate the values and relations these systems are materialising.

The rise of smart homes and Big Mother

Visions of what are now labelled as smart homes have been on the horizon for quite some time (Berg, 1994; Horrigan, 1986; Spigel, 2001), but it is only recently that these technologies are actually being realised in ways that are more widely accessible in a variety of forms – and do not only exist in luxury showrooms and bespoke houses. There is no fixed definition of 'smart homes', in large part because establishing the meanings and narratives around such terms is an important site of struggle for proponents who have ideas, products and services to sell (Gram-Hanssen and

Darby, 2018; Sadowski and Bendor, 2019; Wilson et al., 2015). However, in early work on the emergence of smart homes, Aldrich (2003) offered a definition that is still useful for our purposes. This definition encompasses the smart home's expansive and generic ambitions: 'A residence equipped with computing and information technology which anticipates and responds to the needs of the occupants, working to promote their comfort, convenience, security and entertainment through the management of technology within the home and connections to the world beyond' (Aldrich, 2003: 17). As we explain further in the next section, it is no accident that the smart home is designed to perform the type of stereotypically feminised work – anticipating needs, promoting comfort and maintaining domestic life – that has been traditionally seen as 'wifely duties' (Strengers and Kennedy, 2020).

Even at the peak of the mid-century, post-industrial suburban home, companies were already using concept designs and exhibitions – such as Disneyland's Monsanto House of the Future in the 1950s and 1960s (Maalsen, 2020b) – to sketch new blueprints for how the means of social reproduction would continue to be revolutionised. Meanwhile, popular media such as *The Jetsons* inserted the idealised 'normal' family unit into a space-age setting that combined visionary technological innovations and reactionary social relations. While these depictions seem outdated now, they remain touchstones that continue to shape contemporary smart home concepts and consumer goods, orienting the smart home towards the 'perfect day' (Heckman, 2008). This work of constructing the domestic future, part of what has been called 'the business of expectations' (Pollock and Williams, 2010), created space in the collective imagination for the next phase of living better through technology.

Countless homes now have some form of smart technology – ranging from the humble voice-activated assistant to a fully networked system – and that number is growing every year as the things we live with are networked into the internet of things and connected to remote corporate servers, often by default (Amoore, 2020; Sadowski, 2020). Whether entrepreneurial start-ups or multinational conglomerates; companies are now aggressively pushing into a smart home market that is projected to be worth US$53 billion globally by 2022 (Statista, 2020). Tech titans, such as Google and Amazon, sell household devices that can answer questions, respond to direct commands and control other connected things such as lights and speakers. Major manufacturers, such as GE and Samsung, offer smart versions of home appliances such as stoves and fridges. Whereas the dumb stove was used to just cook food, the smart stove will keep track of what you eat, how often and when. Future upgrades are likely to include serving up advertisements from competing brands or suggesting changes to your diet.

This technological upgrade to the home does not mean that we just keep doing what we were already doing, except now better or easier. 'The increasing embedding of software into home technologies – coded objects – is reconfiguring the home in new ways, "transducing" the space of home to create new spaces and catalyse new spatialities' (Maalsen, 2020b: 1538). Our patterns of everyday life change as activities are mediated by, and reliant on, a glut of gadgets that are data-driven, internet-connected and automatically controlled. Our spaces become more fluid, instantly capable of moving from one purpose (e.g. work) to another (e.g. entertainment); yet more routine as capabilities and commands are coded and automated into the system (Dodge and Kitchin, 2009). Our homes become more open as a node plugged into a global network of information and communication; yet more crowded as a stable of companies, and the third parties they invite inside, take up residence in our homes through our devices (Goulden, 2021; Maalsen and Sadowski, 2019).

Within this range of possibilities and changing spatial arrangements, we are interested in the role of smart home technologies' soothing feminine presence in introducing new or accelerating existing, capitalist modes of care and control in the home. We build here on Strengers and Kennedy's (2020) interpretation of 'Big Mother'.[1] This concept draws attention to the ways in which the manufacturers of what these authors call 'smart wives' – feminized artificial intelligence, digital

assistants and robots that take on traditional wifely roles in the home – employ feminine names, voices, roles and personality traits to provide a more acceptable and seemingly 'caring' form of surveillance in the home, which serves the interests of capitalist accumulation and commodification of personal data.

Big Mother is a spinoff of Big Brother, originally the omnipotent and all-seeing surveillant power from George Orwell's science fiction novel *1984*, and taken up in contemporary contexts as a popular reality television series that monitors and controls the occupants of a large and opulent shared house for viewer entertainment. Big Brother is now a widely recognised phrase in popular culture, referring to any sinister form of oversight or monitoring (with manipulative intent), often done without the monitored persons' knowledge or consent. However, Big Mother is not primarily a political omnipresence but rather a marketised one, seeking to mediate the labours of social reproduction and carry out the logics of digital capitalism.

We take up the concept of Big Mother here to extend Strengers and Kennedy's (2020: 193) concerns about how manufacturers use feminine characteristics in the design of smart wives such as digital voice assistants (e.g. Google Home, Alexa and Siri), to 'supply paternalistic control and influence, albeit under the cloak of a soothing maternal figure'. By this, these authors refer to a recurring argument made by techno-feminist scholars, who show how a central smart home ambition and fantasy is to take on the role of a housewife or mother in the types of duties and care this technology seeks to provide (Kember, 2016; Rhee, 2018; Robertson, 2017; Spigel, 2005).

But of course, the smart home is *not* a wife and cannot function as a simple 'wife replacement' (Strengers and Nicholls, 2018). Furthermore, industry and consumer fantasies for smart wives do not reflect the myriad ways in which these emerging technologies are taken up and integrated (or rejected) into diverse households through messy processes that Dourish and Bell (2011: 92) refer to as 'flex, slop and play'. As Dodge and Kitchin (2009: 1362) argue, 'the everyday use of coded objects reshapes the spatiality of the home by altering how domestic tasks are undertaken (not always more conveniently for all), introducing new tasks and sometimes greater complexity, and embedding the home in diverse, extended systems of consumption and governmentality'. It is the 'extended systems' provided by Big Mother that we are interested in here. These take a number of forms.

One purpose of Big Mother is that it helps to mask how various products and devices of the smart home (and the larger political–economic systems they are part of) become a 'black box'. Ordinary people become 'increasingly passive and accepting of' situations in which large corporations control technologies within the home that break down and collect their data (Tanczer et al., 2018). This is now a commonplace practice in big tech corporations: 'Apple is notorious for promoting their products as simultaneously enchanting and non-threatening, inscrutable yet easy to use' (Bergen, 2016: 100). The less threatening a device is perceived, the more consumers are able to maintain the illusion that they are in control. Home-based digital assistants such as Alexa and Google Home are designed with default feminine presences, which are meant to ease their integration into everyday life and enrol users into techno-economic 'ecosystems' by delivering services in ways that are perceived as palatable and acceptable to potential consumers.

The prevalence of large corporate players in the smart home market increases homogeneity and centralised control over data privacy. To complicate matters, the companies designing, making and selling smart products are often not fully aware of the potential value of the data that they collect from their users when releasing their products, but plan to later establish markets for the data and insights. In *The Age of Surveillance Capitalism*, Zuboff (2019: 8) attacks the largest internet companies (with a particular focus on Google and Facebook) for their unilateral claims to human experience 'as free raw materials for translation into behavioural data'. This form of surveillance capitalism, writes Zuboff (2019: 9), is 'parasitic and self-referential' – such as a 'vampire', it feeds on the human experience, and packages these up as commodities for third parties and

'means to others' ends'. The aim 'is no longer to automate information flows about us', asserts Zuboff (2019: 10). 'The goal now is to automate us'. While there has been good criticism about the claims versus ability of these companies to act like puppet masters of consumers (Doctorow, 2020), it is worth keeping in mind their ultimate aims, especially as they continue striving to innovate techniques for realizing these goals.

Another potential purpose of Big Mother that we are interested in here speaks more to Cowan's analysis of the industrial revolution of the home. Whereas earlier models of domestic housekeeping appliances were previously marketed towards women as a way to free up their leisure time (with entertainment devices targeting men), smart home technologies are often subtly marketed towards men and aimed at helping them to contribute more equally to household and caring labours in the home (Strengers and Nicholls, 2018). More broadly, Spigel (2001: 416) contends that these technologies 'do not merely promise leisure through the purchase of household appliances (as they had since the 1920s), they also offer potential consumers the dream of superproductivity – and at no personal sacrifice to love, happiness, heath, leisure and child-rearing'. Big Mother manifests as an entity, which traditional household labours can be outsourced to, or as something that can take on the traditional wifely and mothering labours of the home in order to enhance productivity (Strengers and Kennedy, 2020). In this context, the wife – or rather the services she has traditionally provided – is positioned as a fetishised market.

To analyse and categorise the emergent effects of Big Mother, and understand how this system is entering the home and mediating social reproduction, we draw on our past research on the smart home (Sadowski, 2020; Strengers and Kennedy, 2020), and ongoing scholarship on techno-feminism, digital geographies and political economy. We identify three core tensions arising through the materialisation of Big Mother and the smart home imaginaries and realities it represents.

Tension 1: Outsourcing autonomy through enhanced control and choice

If a person's home is their castle, then smartification promises to give you even greater control and choice over your domain. For instance, domestic energy management systems have become a booming area of focus for consumers, utility companies and government policymakers (Chandrashekeran, 2020; Strengers and Nicholls, 2017; Wilson et al., 2017) – not to mention a number of third parties who want to capture value from this new market in energy data and services. Such systems build a range of new capabilities on top of smart energy meters. On the more passive end are 'showing' technologies such as home data dashboards accessed via apps that visualise household energy usage, trends, comparisons, pricing and other types of fine-grain data that communicate how and when the house consumes electricity (Kragh-Furbo and Walker, 2018). By obtaining this information, the idea is that people will use it to make better decisions about, and exact better control over, how the house functions and how inhabitants behave in relation to a larger socio-technical energy system.

On the more active end are 'doing' technologies such as automated management software that take control over energy-intensive appliances such as heating, air conditioning and washing machines so their operations can be 'orchestrated and optimised' based on feedback from the energy grid and price signals (Sadowski and Levenda, 2020). By delegating some control over the household to algorithms and/or utilities, the intention is that we actually gain more freedom and convenience because we no longer must concern ourselves with much of the technical complexity involved in running the contemporary home. Whether by showing or doing, the smart home aims to empower its inhabitants to make the right managerial decisions about household labour and finances, with a current focus on energy usage (Hargreaves et al., 2015).

The tension arising between enhanced control over our domestic environment in exchange for opening the home to other agents and outsourcing some of our own autonomy is not unique to

this emerging phase of smartification. It is worth quoting an insightful passage from Cowan on just *who* was involved in making the industrial home:

> The industrialization of the home was determined partly by the decisions of individual householders but also partly by social processes over which the householders can be said to have had no control at all, or certainly very little control. Householders did their share in determining that their homes would be transformed (indeed, we have very few records of any who actively resisted the process), but so did politicians, landlords, industrialists, and managers of utilities. (Cowan, 1983: 14)

Smartification has opened up the home even more, thus accelerating this pattern of non-inhabitants influencing how the home is transformed and lived in. For example, we can now see landlords mandating the installation of smart locks, digital apps/platforms and security cameras with facial recognition (Fields, 2019) or device manufacturers sneaking in through the backdoor of networked devices that are always on, always listening, and always communicating with cloud servers (Hill and Mattu, 2018). In effect, homes are becoming 'controlled environments' – in the sense that they are spaces subject to and shaped by automatic systems of enclosure, regulation and feedback (Lockhart, 2019), often (but not always) installed by occupants themselves. The vital processes of reproduction, protection and consumption that the home supports are now intimately linked to the operation of various smart technologies.

The core tension here is over who gets to set the parameters for control within the household. Who gets to structure patterns of behaviour and whose interests are represented? It is no longer the case that we can assume the answer to any of these questions is only or primarily 'the home's inhabitants'. While the personalisation and individualisation of the smart home are central to its marketing and user interfaces, and to the ways in which householders adopt and engage with these technologies, such options for control are contained within relatively limited 'choice sets'. These are what Levett et al. (2003: 2) describe as 'the "package deals" of interconnected acts of consumption which are available given particular infrastructures and market conditions'. Corporate players in the smart home market have their own set of agendas, which become manifested as different forms of control and choice sets.

Such external influence is, again, not totally new in either degree or type; those who are poor, women, of colour and/or working class have long been saddled with disciplinary forms of 'home invasion' (Maalsen and Sadowski, 2019). However, at the same time, there are crucial differences in both degree and type as Big Mother offers powerful capacities for controlling the home and what happens inside it. The promise of enhanced control over our environment is in contradiction to the fact that corporations now maintain ownership and remote control over the software embedded in the furniture and appliances, locks and light bulbs that fill a smart home – thus enacting a form of digital enclosure over our living spaces. In true capitalist fashion, it is highly unlikely we will own, or even be able to modify, the means of social reproduction. That is the price paid for living and working (from home) smarter.

Tension 2: Increased monitoring for efficient management

By framing the home as the social factory (Federici, 2012), Marxist-feminists emphasise that it is a site of labour and value creation, that it is plugged into circuits of capital accumulation and production and that the spaces and practices of 'life's work' are also subject to industrial logics (Mitchell et al., 2003). Now, as the machinery of reproduction is made smarter, the home is also becoming a 'data factory', as design critic McGuirk (2015) called it. That is, it is also a site for new forms of digital labour (Kennedy et al., 2020; Strengers and Nicholls, 2018), plugged into processes of 'data capital' generation (Sadowski, 2019), and integrated with logics of surveillance and control.

The data factory does not supersede the original operations of the social factory, but instead provides a software and hardware upgrade to the reproduction process. It is a digital overlay on top of the homework and care work that still must be done by somebody or something. When a factory is automated, the essential promise is that more can be produced with less resources, less time and less labour – or, at least, better-managed labour (Noble, 1984). In the context of the smart home, what these devices aim to produce is comfort and convenience. With the assistance of Big Mother – by instrumenting, networking and automating the home's activities – we are promoted back to the position of manager in the social factory, overseeing the operations of a technological workforce. The core tension here is that, by accepting this promotion and installing the upgrades, we open ourselves and our homes to greater forms of supervision. Big Mother does more than organise our domestic life; it also observes our behaviours and routines. We unwittingly become middle managers of our household, delegating tasks to individual devices while also being supervised by a larger system.

Smart things provide a window into private domestic spaces. Being able to know how we use appliances – especially ones integrated into our everyday life and linked to our personal preferences – generates a wealth of highly detailed, personal data that would otherwise be out of reach to companies. 'With the ability to monitor every minute of cooking and easily determine the contents in your refrigerator, for example, smart appliances merge connectivity, convenience and performance for an ideal user experience', says John Taylor, a vice president at LG Electronics (quoted in Pickett, 2015: 17). This is how the imperatives of digital capitalism are translated into product designs. Something like a refrigerator is transformed into a data-generating, data-transmitting and data-analysing machine – which keeps food cold too. The business model propelling smart technology means that these companies 'want to invade that refrigerator, measure it, instrument it, monitor any interactions with it; [they] would cheerfully give away a fridge at cost' (Sterling, 2014: loc. 68). For manufacturers who have embraced the smart home shift, the real value accumulated from these appliances comes from their production of data over time and the potential to divine patterns and 'actionable insights'. Here we see both of Big Mother's imaginaries, caring and controlling, in operation through the idea of a fridge that can help us remember to order the milk or automatically add it to our shopping list (traditional 'motherly' roles), which leads us down a seemingly innocuous pathway to a bigger purpose: to monitor and modify people's fridge-related habits.

For many who choose to smartify their homes, the tension between better management and greater monitoring will feel more like a trade-off they are willing to make. As past research has shown, some even do so happily or indifferently to access the conveniences these devices provide (Strengers et al., 2019). That is because many components of the smart home have the characteristic of what Gilliard (2020: np) calls 'luxury surveillance', which 'is expensive, voluntary and sleek (yet often meant to be noticed)', whereas, 'imposed surveillance is involuntary, overt, clunky and meant to stand out'. In terms of the social relations surrounding their use, these two forms of surveillance appear to be antithetical to each other. Yet, their technical–material–spatial form may be nearly identical. Consider a different example of near-identical technology used for antithetical purposes: the black boxes that insurers incentivise customers to install in their vehicles and the 'starter interrupt device' that creditors require as a condition of (subprime) auto loans. The former tracks how, when and where a person drives and offers the possibility of discounted premiums and faster claims. The latter tracks how, when and where a person drives and threatens to disable the vehicle if payment is late. The separation between forms of surveillance and the extant distribution of power and benefits are not etched in stone.

In a comparative analysis of surveillance systems used in affluent gated communities and low-income public housing, Monahan (2006) further illustrates how these distinctions blur. In terms of how both groups internalised and were regulated by surveillance, Monahan (2006) concluded that the similarities are striking. It really comes down to which class of surveillance – which side of Big

Mother – you qualify for based on your current position in society. To be sure, this distinction really does matter; it directly affects the material conditions and life chances a person experiences. But it is also important to recognise how the parameters of possibility are being set such that they always include some form of managerial supervision. When Big Mother watches us through our Ring doorbell, Nest thermostat and LG fridge, we are meant to welcome the loving embrace of 'the data gaze' (Beer, 2018). Big Mother conflates a form of surveillance founded on care with one based on control. The switch from 'watching out for' to 'watching over' can be seamless.

The targets, spaces and impacts of surveillance will always be uneven. At the same time, it is a delusion of privilege to think that the consequences of surveillance will only ever be felt by other parts of society and that the distinctions between luxury and imposed surveillance will be maintained. Those boundaries are flexible; they are easily breached and redefined. Indeed, considering how often that trust is broken, it seems Big Mother cannot help but collect *all data* available, under the guise of improving services, and then share (or sell) it with any number of interested third parties. Thus, expanding the network of care/control to include other manufacturers, advertisers, insurers, police, etc. By acting on this 'data imperative', in other words, Big Mother is simply 'seeing like a market' (Fourcade and Healy, 2017). Through the smart home, the places and practices of life's work have been established as a new frontier for new forms of value extraction (Mezzadra and Neilson, 2017). By posing as luxury surveillance and promising to automate convenience, the smart home is an ingenious way of installing the infrastructure of digital capitalism in the private places that are hardest to reach – and getting us to pay for the privilege.

Tension 3: Revaluation of care through optimisation of the home

In addition to Big Mother's external eye(s), 'she' is also concerned with providing emotional, caring, and intimacy labours traditionally falling to women and wives. Here we see a 'curious mixture of nostalgia and futurism', that Spigel (2001: 35–36) argues resembles more a '"defamiliarisation" of the present' rather than a new utopia; 'a constant procession of digitally enhanced "same"'. These forms of care also create a type of racial erasure with their marketing towards White, middle-class nuclear family lifestyles and through the deracialised voices of digital voice assistants such as Amazon Echo's Alexa (Phan, 2019). Largely serving heterosexual, middle-class and White nostalgia for wifely labours, Big Mother is therefore positioned as a way to uphold and reproduce a heteronormative and traditional feminine workforce – in a way that again seeks to position this transferal of responsibility (from woman to machine) as a natural, desirable and non-threatening 'progression'. This potentially obscures many other household configurations, such as people who live in shared housing (Maalsen, 2020a), as well as the gender, racial, income and age variation within and between homes.

There is no shortage of devices on the market or under development that provide forms of care, whether that be Amazon Alexa's role in remembering important details, acting on 'hunches', or helping to set the right 'mood' through integration with smart lighting 'scenes'; or devices and robots that provide care and emotional connection through conversation and assistance. Other devices, such as nanny cams or digital voice assistants with 'skills' that help entertain or educate children, or keep track of bedtimes, are more explicitly linked to responsibilities that have traditionally fallen to parents, teachers or nannies. Similarly, in aged care settings, there are considerable developments in providing smart home technologies and robots to deliver caregiving support for those who are unable to independently care for themselves.

However, like the trade-offs between monitoring and management, these digital forms of caregiving come with their own Big Mother risks, particularly for children, who may be vulnerable to data manipulation and privacy risks (Barassi, 2020). Breaches of connected toys have been highly publicised, including hacks of Mattel's Wi-Fi Hello Barbie, VTech's Learning Lodge and Spiral

Toys' CloudPets. In the case of CloudPets, the breach involved the releasing of hundreds of thousands of user account details including children's photos, names, birthdays and voice messages (Holloway, 2019).

Aside from these security and privacy vulnerabilities, there are additional concerns about whether outsourcing and optimising care is a desirable pathway for societies, and whether this is indeed possible. On the first concern, the undervaluing of care in labour markets, as well as care's increasing commodification, have been long-running concerns for feminists. As de la Bellacasa (2011: 95) writes, 'it is important to stay close to the material signification of caring when insisting on giving marginalised issues a voice in the staging of technoscientific mediations. Care can be easily idealised as a moral disposition, or turned into a fairly empty normative stance disconnected from its critical signification of a labourious and devalued material doing'. Speaking about the value of social robots to provide aged care, Wajcman questions whether this is a desirable path to continue down. 'Perhaps if eldercare was revalued and remunerated like say coding work, the putative labour shortages in this sector that robots are designed to alleviate will disappear. Or, more radically, if housing and cities were redesigned so that the elderly were not relegated to separate places but were integrated into the wider civil society' (Wajcman, 2017: 123).

Likewise, the focus on outsourcing parenting and other caring labours to smart home technologies potentially undervalues these important 'jobs' in society, and sidesteps bigger questions about how to continue delivering these forms of care in gender progressive nations experiencing a 'wife drought' (Crabb, 2015)—or, a lack of people in the home who are available to provide these forms of care (most likely because all adult members of the household are engaged in other forms of paid labour or unpaid care) (Strengers and Kennedy, 2020).

On the second concern, there is growing evidence that seeking to optimise or delegate caring labours to the smart home generates additional labours in the home, commonly known as 'digital housekeeping' (Tolmie et al., 2007). In their account of living in a home fully equipped with smart devices, Hill and Mattu (2018: np) allude to these additional imposed labours when they remark, 'I thought the house would take care of me but instead everything in it now had the power to ask me to do things'. In the smart or networked home, this digital housekeeping involves taking care of the equipment and ensuring it is all operating smoothly and efficiently (Kennedy et al., 2015; Rode and Poole, 2018; Strengers and Nicholls, 2018). What is more, this labour is more likely to fall to one technical 'guru' in the home (Takayama et al., 2012), who is more likely to be a man (Kennedy et al., 2015; Strengers and Nicholls, 2018).

The kinds of digital housekeeping enrolled in the smart home lead Strengers and Nicholls (2018, following Cowan, 1983) to conclude that it is generating 'more work for father', or more work for men, given the gendered nature of this technical labour. However, it is perceived as a form of leisure, characterised as a type of hobby rather than a serious contribution to the housework. This work is actually in its own way often frustrating, mundane and time consuming, occupying time that could be put to use on other household tasks (Kennedy et al., 2015). Perversely then, participating in Big Mother's digital housekeeping may create more work in the household, and further reinforce existing gendered divisions of labour by occupying more of a man's time in a heteronormative household rather than becoming one of many responsibilities shared by all within the home unit.

Simultaneously, emerging technologies and market relationships in the home are opening up other forms of gendered housework that present opportunities to disrupt – and also further entrench – traditional heteronormative divisions of labour and care. For example, in Johnson's (2020) research on household energy demand-side response programs, featuring time-reflective tariffs or offers, she highlights the important role of 'Flexibility Woman' as someone who responds to such programs through her intimate knowledge of chore-based routines and ability to recruit and delegate family members into her response. Johnson puts forward Flexibility Woman as an empirically -informed counterpoint to Strengers' (2013) critique of Resource Man – the idealised energy

consumer implicit in energy industry visions for demand-side management. Her account demonstrates how fetishised industry visions for household consumers can significantly depart from their original intentions. Similarly, accounts of women using smart devices to increase their productivity and multitasking capability, men employing them to engage in new forms of care and chores, older people engaging with voice assistants for play and fun, or people (re)gendering their robotic vacuum cleaners and social robots as male, 'bot' or queer, show how these narratives can be shifted once technologies arrive in the home (Strengers and Kennedy, 2020).

The pursuit of optimising care with Big Mother technologies is then neither a straightforward nor necessarily desirable approach. Our main concern is that this pursuit may undermine feminist efforts to revalue and elevate the status of care in capitalist labour markets, by diverting attention towards a version of the smart home driven by outsourcing and optimising duties that are still seen as unproductive or worthless. Additionally, the introduction of Big Mother's mode of care may change what care is, how we understand it in society, or create additional forms of care that supplement those that already exist. This may have both positive and negative outcomes for elevating the status of care in society. For example, care delivered by the smart home may become understood as a form of 'careful surveillance' (Richardson et al., 2017) involving the monitoring of others, rather than (or in addition to) physical intimacy, conversation, or emotional support. This, in turn, could afford new types of caring masculinities, whereby smart technologies that are more likely to be introduced into the home by men are used for masculinised caregiving, such as monitoring the occupants to ensure they are safe and comfortable (Strengers and Kennedy, 2020). Such possibilities present new opportunities not only to marketise caregiving, but also to make the delivery and definition of care dependent on smart home markets.

Conclusion

In this paper, we have analysed the emerging tensions arising through the ways smart homes are changing relations of social reproduction and embedding digital capitalist logics into domestic practices and spaces. We have advanced the concept of Big Mother as a way of understanding how this techno-political regime is nurturing imaginaries and realities of home life founded on a relationship between control and care. After laying out the dominant narratives driving the development of smart homes, we identified three key areas where these tensions are manifesting through Big Mother: (a) outsourcing autonomy through enhanced control and choice, (b) increased monitoring for efficient management and (c) revaluation of care through optimisation of housework. For each area, we explored how new technological capacities promise to enhance our abilities to care for our homes, families and selves. Yet, at the same time, these innovations also empower Big Mother to enrol people into new practices of surveillance, new forms of automation and new markets of data.

In a broader sense, the smart home is meant to finally make good on the promised domestic benefits of industrial innovation and mass production. The social factory will finally be automated as manual labour is supplanted by mechanised work (Federici, 2012). The processes of 'life's work' will be fully subsumed into 'capitalist social formations' as they are hyper-mediated and hyper-marketised by digital services (Mitchell et al., 2003). The 'crisis of care' will be solved by domestic systems that optimise and maximise the provision of care and convenience (Fraser, 2016). While the entrepreneurs and engineers behind the smart home do not tend to use the language of feminist theory, it is common to see these kinds of technologies framed in emancipatory terms. Yes, they are selling a product, but they are also selling freedom from labour, power over things/spaces and access to experiences such as 'protection, productivity and pleasure' (Strengers et al., 2019, 2020).

It is important to note that the operations and outcomes of Big Mother we describe here are still a system in progress; we are working in both present tense and forward-looking registers. This version of the smart home, with Big Mother as its heart, is shaping but not determining possible

futures for the smart home. Our purpose in this paper has been to push back against the influential ideas of smart homes based on luxury surveillance and caring systems by showing that they exist in constant relation with a supposedly antithetical version of the smart home represented by Big Mother.

Most existing smart homes are unlikely to have been built from scratch or completely renovated all at once. It is more likely that devices are brought into the home in a piecemeal fashion, installed and upgraded over time. Inevitably different technologies – created by different manufacturers and designed for different purposes – have difficulty communicating with each other and coordinating their functions. This is the problem of interoperability that plagues the internet of things. One system's conception of efficient management of the home, for example, might be at odds with another's conception of enhanced control for users. There are also tensions between the tensions, just as these relations of care and control do not sit neatly together. Most importantly, the imaginary concept of a smart home that acts like a perfectly automated and optimised maternal ecosystem is confronted by the reality of households as imperfectly chaotic and haphazard social spaces.

We conclude by returning to Cowan, by looking to the past so we can pose crucial questions for the future. In what has become a touchstone case study in the history of technology, Cowan (1983) explained: 'how the refrigerator got its hum'. In the early days of the refrigerator, there were electric compression and gas absorption models on the market. We all have electric fridges now, but instead of assuming why one model 'succeeded' and the other 'failed' to be taken up, Cowan delves into the actual development and marketing of these technologies in the early 20th century. What Cowan found, in short, is a story of capital and profit:

> The machine that was 'best' from the point of view of the producer was not necessarily 'best' from the point of view of the consumer. […] We have compression, rather than absorption, refrigerators in the United States today not because one was technically better than the other, and not even because consumers preferred one machine (in the abstract) over the other, but because General Electric, General Motors, Kelvinator, and Westinghouse were very large, very powerful, very aggressive, and very resourceful companies, while [their gas competitors] Servel and SORCO were not (Cowan, 1983: 143–144)

Cowan goes on to explain how design decisions about the refrigerator were made with the interests of the electric utilities in mind, even above the interests of the users. Those values were then materialised into a technology that has become ubiquitous in the modern household and essential to modern life.

The point here is not only to say that corporate interests shape our future. This will come as no surprise for readers of this journal. Rather, we wish to emphasise a critical historical connection about how those same interests have long had great influence over decisions about which technologies are developed, for whose benefit they are designed, and how we then structure our lives around their use. We say this even while acknowledging the considerable variation in how such technologies are taken up in people's lives and homes. While technologies have changed, their political economy has remained much the same. Too often, in our general thinking about technology, this point is lost or merely accepted as a fact not worth noting. Yet, by no longer raising the point, contingencies in technological development can be ignored or erased; these processes can be treated as deterministic and linear. This is how corporate products become equated with social progress; how economic interests become technological imperatives.

We have to ask, at the beginning of the 21st century, which models of the *smart* refrigerator are being installed in our homes today, not because of technical superiority, but because of the economic interests and social influence of the technology's makers and investors? What alternative technologies are being forgone because the 'successful' option is deemed 'best' according to the

values of its producers, not its users? What alternative patterns of domestic life, what other types of socio-technical relations, will be devalued and may not be realised? What other ways of delivering care are not being considered? What does it mean to treat the smart home not as a source of care but as a 'matter of care' by 'finding ways to re-affect an objectified world' and 'modifying their potential to affect others?' (de la Bellacasa, 2011: 99). We do not have the benefit of hindsight like Cowan. We must rely on foresight in our critical analysis of the smart home. But that also means these decisions are still being made, the shift is still underway. As new systems and relations are introduced, we have the opportunity to reevaluate what they (should) mean and how they (should) work.

Acknowledgements

An early version of this paper was prepared for the symposium on 'Bringing Life's Work to Market' at the University of Auckland in December 2019. The authors would like to thank the organisers and participants for their helpful feedback on that presentation and, thank again, the editors of this theme issue for their comments on drafts of this paper. We also thank the anonymous reviewers for their insightful and supportive comments, which greatly helped refine the paper's analysis and clarify its contribution.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Note

1. The term Big Mother has previously been coined by Sofoulis (Sofia, 2000: 181) to refer to the imagination of Nature since the birth of early modern science 'as a Big Mother full of treasures (material, land, knowledge) to be plundered and re-sourced'.

References

Aldrich FK (2003) Smart homes: Past, present and future. In: Harper R (ed) *Inside the Smart Home*. London: Springer-Verlag, pp. 17–39.

Amoore L (2020) *Cloud Ethics Algorithms and the Attributes of Ourselves and Others*. Durham, NC: Duke University Press.

Barassi V (2020) The Human Error in AI and Children Rights: Response to the Consultation on the White Paper on Artificial Intelligence – A European Approach. 14 June. Available at: http://childdatacitizen.com/cdc/wp-content/uploads/2020/06/The-Human-Error-in-AI-and-Children-Rights_Prof.-Barassi_Response-to-AI-White-Paper-.pdf (accessed 15 October 2020).

Beer D (2018) *The Data Gaze: Capitalism, Power and Perception*. SAGE Publishing.

Berg AJ (1994) A gendered socio-technical construction: The smart house. In: Cockburn C and Furst Dilic R (eds) *Bringing Technology Home: Gender and Technology in Changing Europe*. Buckingham: Open University Press, pp. 165–180.

Bergen H (2016) 'I'd blush if I could': Digital assistants, disembodied cyborgs and the problem of gender. *Word and Text, A Journal of Literary Studies and Linguistics* (1): 95–113.

Chandrashekeran S (2020) From responsibilization to responsiveness through metrics: Smart meter deployment in Australia. *Geoforum; Journal of Physical, Human, and Regional Geosciences* 116: 110–118.

Cowan RS (1983) *More Work for Mother: The Ironies of Household Technology From the Open Hearth to the Microwave*. New York: Basic Books.

Crabb A (2015) *The Wife Drought: Why Women Need Wives, and Men Need Lives*. Sydney: Penguin.

de la Bellacasa MP (2011) Matters of care in technoscience: Assembling neglected things. *Social Studies of Science* 41(1): 85–106.

Doctorow C (2020) How to destroy surveillance capitalism. *OneZero*, 26 August. Available at: https://onezero.medium.com/how-to-destroy-surveillance-capitalism-8135e6744d59 (accessed 2 March 2021).

Dodge M and Kitchin R (2009) Software, objects, and home space. *Environment and Planning A: Economy and Space* 41(6): 1344–1365.

Dourish P and Bell G (2011) *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing*. Cambridge, MA: The MIT Press.

Federici S (2012) *Revolution at Point Zero: Housework, Reproduction, and Feminist Struggle*. Oakland, CA: PM Press.

Fields D (2019) Automated landlord: Digital technologies and post-crisis financial accumulation. *Environment and Planning A: Economy and Space*. DOI: 10.1177/0308518X19846514.

Fourcade M and Healy K (2017) Seeing like a market. *Socio-Economic Review* 15(1): 9–29.

Fraser N (2016) Contradictions of capital and care. *New Left Review* 100: 99–117.

Gilliard C (2020) The two faces of the smart city. *Fast Company*, 20 January. Available at: www.fastcompany.com/90453305/the-two-faces-of-the-smart-city (accessed 15 October 2020).

Gold R (1995) How smart does your bed have to be, before you are afraid to go to sleep at night? *Cybernetics and Systems: An International Journal* 26(4): 379–386.

Goulden M (2021) 'Delete the family': Platform families and the colonisation of the smart home. *Information, Communication and Society* 24(7): 903–920.

Gram-Hanssen K and Darby S (2018) "Home is where the smart is"? Evaluating smart home research and approaches against the concept of home. *Energy Research and Social Science* 37(Suppl. C): 94–101.

Hargreaves T, Hauxwell-Baldwin R, Coleman M, et al. (2015) Smart homes, control and energy management: how do smart home technologies influence control over energy use and domestic life? In: European council for an energy efficient economy 2015 summer school, Toulon/Hyeres, France, June, pp. 1021–1032.

Heckman D (2008) *A Small World: Smart Houses and the Dream of the Perfect Day*. Durham, NC: Duke University Press.

Hill K and Mattu S (2018) The house that spied on me. *Gizmodo*, 8 February. Available at: www.gizmodo.com.au/2018/02/the-house-that-spied-on-me/ (accessed 14 May 2020).

Holloway D (2019) Surveillance capitalism and children's data: The Internet of toys and things for children. *Media International Australia* 170(1): 27–36.

Horrigan B (1986) The home of tomorrow, 1927–1945. In: Corn JJ (ed) *Imagining Tomorrow: History, Technology and the American Future*. Cambridge, MA: The MIT Press, pp. 137–163.

Johnson C (2020) Is demand side response a woman's work? Domestic labour and electricity shifting in low income homes in the United Kingdom. *Energy Research and Social Science* 68: 1–9.

Kember S (2016) *iMedia: The Gendering of Objects, Environments and Smart Materials*. London: Palgrave Macmillan.

Kennedy J, Arnold M, Gibbs M, et al. (2020) *Digital Domesticity: Media, Materialities and Home Life*. Oxford: Oxford University Press.

Kennedy J, Arnold M, Nansen B, et al. (2015) Digital housekeepers and domestic expertise in the networked home. *Convergence: The International Journal of Research into New Media Technologies* 21(4): 408–422.

Kragh-Furbo M and Walker G (2018) Electricity as (big) data: Metering, spatiotemporal granularity and value. *Big Data and Society* 5(1): 1–12.

Levett R, Christie I, Jacobs M, et al. (2003) *A Better Choice of Choice: Quality of Life, Consumption and Economic Growth*. London, England: Fabian Society.

Lockhart A (2019) Microclimates of urban reproduction: The limits of automating environmental control. *Antipode* 52(3): 637–659.

Maalsen S (2020a) 'Generation share': Digitalized geographies of shared housing. *Social and Cultural Geography* 21(1): 105–113.

Maalsen S (2020b) Revising the smart home as assemblage. *Housing Studies* 35(9): 1534–1549.

Maalsen S and Sadowski J (2019) The smart home on FIRE: Amplifying and accelerating domestic discipline. *Surveillance and Society* 16(1/2): 118–124.

McGuirk J (2015) Honeywell, I'm Home! The Internet of Things and the New Domestic Landscape. E-Flux 64 (April). Available at: https://www.e-flux.com/journal/64/60855/honeywell-i-m-home-the-internet-of-things-and-the-new-domestic-landscape/ (accessed 13 October 2020).

Mezzadra S and Neilson B (2017) Operations of capital. *South Atlantic Quarterly* 114(1): 1–9.

Mitchell K, Marston SA and Katz C (2003) Introduction: Life's work: An introduction, review and critique. *Antipode* 35(3): 415–442.

Monahan T (2006) Electronic fortification in Phoenix: Surveillance technologies and social regulation in residential communities. *Urban Affairs Review* 42(2): 169–192.

Noble DF (1984) *Forces of Production: A Social History of Industrial Automation*. Knopf.

Phan T (2019) Amazon Echo and the aesthetics of whiteness. *Catalyst: Feminism, Theory, Technoscience* 5(1): 1–38.

Pickett L (2015) The smart home revolution. *Appliance Design* 63(1): 16–18.

Pollock N and Williams R (2010) The business of expectations: How promissory organizations shape technology and innovation. *Social Studies of Science* 40(4): 525–548.

Rhee J (2018) *The Robotic Imaginary: The Human and the Price of Dehumanized Labor*. Minneapolis: University of Minnesota Press.

Richardson I, Hjorth L, Strengers Y, et al. (2017) Careful surveillance at play: Human–animal relations and mobile media in the home. In: Gómez Cruz E, Shumartojo S and Pink S (eds) *Refiguring Techniques in Digital Visual Research*. London: Palgrave MacMillan, pp. 105–116.

Robertson J (2017) *Robo Sapiens Japanicus: Robots, Gender, Family, and the Japanese Nation*. Berkeley, CA: University of California Press.

Rode JA and Poole ES (2018) Putting the gender back in digital housekeeping. In: Proceedings of the 4th conference on gender and IT, Heilbronn, Germany, pp. 79–90.

Sadowski J (2019) When data is capital: Datafication, accumulation, and extraction. *Big Data and Society* 6(1): 1–12.

Sadowski J (2020) *Too Smart: How Digital Capitalism is Extracting Data, Controlling Our Lives, and Taking Over the World*. Cambridge, MA: The MIT Press.

Sadowski J and Bendor R (2019) Selling smartness: Corporate narratives and the smart city as a sociotechnical imaginary. *Science, Technology and Human Values* 44(3): 540–563.

Sadowski J and Levenda A (2020) The anti-politics of smart energy regimes. *Political Geography* 81: 102202.

Sofia Z (2000) Container technologies. *Hypatia* 15(2): 181–201.

Spigel L (2001) *Welcome to the Dreamhouse: Popular Media and Postwar Suburbs*. Durham, NC: Duke University Press.

Spigel L (2005) Designing the smart house: Posthuman domesticity and conspicuous production. *European Journal of Cultural Studies* 8(4): 403–426.

Statista (2020) Forecast market size of the global smart home market from 2016 to 2022 (in billion U.S. dollars). Available at: https://www.statista.com/statistics/682204/global-smart-home-market-size/ (accessed 13 October 2020).

Sterling B (2014) *The Epic Struggle for the Internet of Things*. Moscow: Strelka Press.

Strengers Y (2013) *Smart Energy Technologies in Everyday Life: Smart Utopia?* London: Palgrave MacMillan.

Strengers Y, Hazas M, Nicholls L, et al. (2020) Pursuing pleasance: Interrogating energy-intensive visions for the smart home. *International Journal of Human–Computer Studies* 136: 1–14.

Strengers Y and Kennedy J (2020) *The Smart Wife: Why Siri, Alexa and Other Smart Home Devices Need a Feminist Reboot*. Cambridge, MA: The MIT Press.

Strengers Y, Kennedy J, Arcari P, et al. (2019) Protection, productivity and pleasure in the smart home. In: CHI '19 proceedings of the SIGCHI conference on human factors in computing systems: weaving the threads of CHI.

Strengers Y and Nicholls L (2017) Convenience and energy consumption in the smart home of the future: Industry visions from Australia and beyond. *Energy Research a Social Science* 32: 86–93.

Strengers Y and Nicholls L (2018) Aesthetic pleasures and gendered tech-work in the 21st-century smart home. *Media International Australia* 166(1): 70–80.

Takayama L, Pantofaru C, Robson D, et al. (2012) Making technology homey: finding sources of satisfaction and meaning in home automation. In: Proceedings of the 2012 ACM conference on ubiquitous computing, Pittsburgh, Pennsylvania, pp. 511–520.

Tanczer L, Steenmans I, Elsden M, et al. (2018) Emerging risks in the IoT ecosystem: Who's afraid of the big bad smart fridge? In: *Living in the Internet of Things: Cybersecurity of the IoT*. London: Institution of Engineering and Technology. DOI: 10.1049/cp.2018.0033.

Tolmie P, Crabtree A, Rodden T, et al. (2007) Making the home network at home: digital housekeeping. In: Bannon L, Wagner C, Gurwin R, Harper R and Schmidt K (eds). Limerick, Ireland, 24–28 September: 331–350.

Wajcman J (2017) Automation: Is it really different this time? *British Journal of Sociology* 68(1): 119–127.

Wilson C, Hargreaves T and Hauxwell-Baldwin R (2015) Smart homes and their users: A systematic analysis and key challenges. *Personal and Ubiquitous Computing* 19: 463–476.

Wilson C, Hargreaves T and Hauxwell-Baldwin R (2017) Benefits and risks of smart home technologies. *Energy Policy* 103: 72–83.

Zuboff S (2019) *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. New York, NY: Public Affairs.