Connected older citizens

Ageing in place and digitally mediated care in Aotearoa New Zealand

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Abstract

Amidst discussions of Aotearoa New Zealand's ageing population, how to care for growing numbers of older people is a considered a preeminent social and political issue. Digital technologies are imagined to be a particularly desirable solution in contexts where social values of independence intersect with the neoliberal state's desire to reduce the amount of money spent on medical and social care. There is a substantial market for gerontechnologies (technologies specifically designed for older people) aiming to capitalise on the 'silver tsunami'. Yet, digital technologies such as smart phones, exercise watches and laptops are widely accessible in Aotearoa New Zealand. They are increasingly used by older people to maintain social connectedness, coordinate practical support, and manage health.

The purpose of this research was to explore how this digitally mediated care functions for community-dwelling older people. Taking an innovative theoretical-methodological approach, I combined actor-network theory with political economy theory. This enabled me to robustly examine sociotechnical care networks, paying attention both to the role of technologies in producing care as well as analysing who benefits from older people's engagements with technology for care. The research draws on interviews with sixteen community dwelling older people, marketing materials of technologies used by those interviewed, the interface of an exchange platform and a patient portal used by some of those interviewed, as well as government documents. This data was analysed using network mapping, thematic analysis, and interface analysis.

I ultimately demonstrate that digitally mediated care practices enact a 'connected older citizen'. Through digitally mediated care practices, older people adjust (and are adjusted) to a culture of connectivity. Digitally mediated care involves new forms of labour. Social connection is framed as a core social value. I argue that digitally mediated self-care redefines independence in terms of the ability to use digital technologies to manage connections to reduce visible dependence on others. Notably, I show the imagined benefits of digitally mediated care are often not realised in practice due to limitations of technologies used in care (such as patient portals). Significantly, the priorities and needs of older people are not often at the forefront of digitally mediated care.

For Gilbert and Joan

Wim and Irene

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1. Techno-fixes for holding back the silver apocalypse

We live in a time of intersecting, overlapping crises – of climate, of environment, of democracy, and of care. The crisis of care refers to the increasing social, economic, and political pressures that are depleting the collective and individual capacities that are needed to sustain families and social groups, and to maintain households and communities (Fraser, 2016). The crisis of care intersects with a globally ageing population. In virtually all countries, there is a numerical and proportional growth of older people in the population. The United Nations (n.d.) report that the ageing population will be one of the most important social issues of the 21st century, with immense political, social, and economic consequences. How increasing numbers of older people will be cared for is one of the most pressing social questions. In policy, media, corporate, and individual conversations the answer is often "with technology".

This chapter begins by outlining the context of the ageing population in Aotearoa New Zealand. I argue that technology emerges as a salient solution for care of older people due to a combination of apocalyptic predictions about future ageing and neoliberal policy and ideological imperatives which connect 'good' ageing to lifestyle choices and ageing in place. At this conjunction, particular kinds of technological solutions become desirable. Digitally mediated care interventions are imagined as being able to align ageing in place policies with the promotion of active forms of ageing (Moreira, 2017), to expand older people's ability to live healthy, independent lives in the community. This research aims to critically evaluate how digitally mediated care is actually functioning for older people ageing in place in Aotearoa New Zealand.

1.1 Ageing in the 21st century

Age is fundamentally a social and material phenomenon. Ageing, in the biological sense, can be understood as the process of senescence — a gradual decline of bodily and cognitive function and increased risk of death and disease (Ayalon & Tesch-Römer, 2018) caused by the accumulation of cellular and molecular damage (WHO, 2018). Physiologically, ageing is multifactorial and multicausal (Holliday, 1997). Within individual bodies, different bodily systems experience physiological changes associated with ageing differently (Casey, 2017). The ageing process differs between individuals (Casey, 2017). Differential life experiences, as

well genetic factors, shape how individuals age. Social institutions and contexts intersect with biological processes, shaping experiences of age (Katz, 2014). Government policies and interventions, culture, patterns of family formation, community relationships, the media, employment norms, and consumer norms all influence how older people are defined, perceived, and treated (Ayalon & Tesch-Römer, 2018). For those ageing in the 21st century, demography, neoliberal policy, and consumption are important factors shaping the possibilities for ageing.

1.1.1 Apocalyptic demography

Since the late 20th century, demographic predictions have played an increasingly important role in shaping ageing and care policy (Raisborough & Watkins, 2021). A future where older people comprise a larger number of and larger portion of people within the population is presented as certain and as a concern (Raisborough & Watkins, 2021). The number of people aged over 65 is increasing, and older people (defined as those over 65) are increasing as a portion of the population. Virtually every country in the world is experiencing population ageing (WHO, 2018). In Aotearoa New Zealand, it is estimated that by 2050 those aged 65 and over will constitute 25 percent of the population (Khawaja & Thomson, 2007, p. 4), numbering almost 1.5 million (Stats NZ, 2022). Comparatively, in 2016, people over 65 accounted for 15 percent of the population (Tun et al., 2021) and numbered 692,000 (Stats NZ, 2022).

The ageing population is driven by increased life expectancy and declining birth rates (Te Tari Kaumātua, 2021). Population ageing is strongly associated with the baby boom that followed the second world war (Te Tari Kaumātua, 2021). Aotearoa New Zealand's population ageing is expected to be particularly profound because the baby boom was very pronounced here (Dale et al., 2012). However, the trend toward population ageing is expected to continue beyond the ageing of this cohort (Te Tari Kaumātua, 2021). Increased life expectancy can be linked to decreased incidences of mortality from infectious disease (Crimmins & Vasunilashorn, 2016), declining neonatal and maternal deaths (Salz & Powell, 2020), and socio-economic development. Whilst people are living longer, a decrease in the prevalence and severity of disability and illness is not occurring at the same rate. Non-communicable and chronic disease in older people, while no longer lethal, can still be disabling (Crimmins & Vasunilashorn, 2016).

Representations of population ageing have frequently drawn on metaphors related to natural disasters ('silver tsunami') to discuss population ageing in the media and policy, reflecting a sense of panic and fear that younger generations will be "swamped" by the fiscal and social burden of caring for greater numbers of older people (Chivers, 2021, p. 3). Dependency ratios calculate the proportion of older and younger people in the population, presenting changes to the structure of the population as an intergenerational burden (Stephens & Breheny, 2018b). As a group, older people are imagined to contribute less than the younger age cohorts to the economy, while costing the country more (Hennessy & Rodrigues, 2019). In Aotearoa New Zealand, population ageing at the beginning of the 21st century was projected to have a 'cost' realised in an impact on living standards in 2051 (notably, however, living standards were still expected to have doubled overall at that point) (Guest et al., 2003).

'Apocalyptic demography' emphasises burden and cost in representations of ageing. It frames generational relations in terms of conflict, questions of entitlement, and individual rights (Robertson, 1997). Predictions emphasise the increasing health cost of an ageing population and the greater share of disability support, public health, and personal primary, secondary and tertiary health care people over 65 will consume into the future (Bryant et al., 2005; Guest et al., 2003; Tun et al., 2021). There are concerns about the costs of residential aged care and the universalised pension. Apocalyptic demography is an over-simplified way of presenting demographic ageing. Demographic ageing is a trend which will not 'hit like a tsunami' but has been developing over at least half a century globally (Fillmore Elbourne & le May, 2019). Aotearoa New Zealand also experienced a sudden rise in ageing people at the end of the 19th century (Tennant, 1983). Demographic changes are not unprecedented. Nonetheless, these metaphors have real effects on how ageing is understood.

1.1.2 Neoliberal responses to future ageing

From the late 1970s, neoliberal politics and ideology have shaped how people age as well as how governments respond to older people. From the 1930s – 1960s, a universalised approach to social policy was favoured in 'developed[1]' countries. Underpinning the mid-20th century

[1] I use the term 'developed' states to refer to states with a well-developed, post-industrial economy as well as a significant technological infrastructure. Global North or Western, also used as descriptors for these countries, is meaningless in this context due to Aotearoa New Zealand's geographical position in the South Pacific. Quotation marks are used around developed to emphasise the problematic nature of the term. 'Development' is inseparable from on-going histories of colonialism and imperialism.

welfare state was the idea that the state had some responsibility to provide for the collective needs of older people. In the 1960s, public policy was reoriented to focus on the individual rights of everyone in society (Belgrave, 2004). The emphasis of social policy related to older people shifted from need to participation, independence and maintaining health (Stephens & Breheny, 2018b). The role of the state in older people's lives is seen to be to 'empower' and 'activate' (Katz, 2000).

Apocalyptic demography intersects with neoliberal policy imperatives to produce new demands for the governance and management of ageing bodies and populations (Bülow & Söderqvist, 2014) in social policy, the media, and every-day life. Future ageing as a problem gathers together various actors and legitimates solutions encompassing a range of actors including the supranational bodies like the UN, the state, the private sector, the research sector, individuals, and various advocacy groups (Cozza et al., 2019). The World Health Organisation's 'Active Ageing' policy framework has been significant in framing the goals for ageing in terms of 'positive', 'healthy', 'successful' and 'active' (Stephens & Breheny, 2018b). These ways of classifying ageing emphasise wellness, participation in community, and social connection (Breheny & Stephens, 2010).

At state-level, these ways framing age influence social policy, not as a challenge to ageism and marginalisation but to mitigate the 'cost' of older people and maximise their contributions (Stephens & Breheny, 2018b). There is a binary construction in policy (and ideological) discourse between active, busy, healthy older bodies and dependant, unwell, negative older bodies (Katz, 2000). For example, in Aotearoa New Zealand, ageing policy that enhances independence is considered to be 'in the best interests' of all New Zealanders (Breheny & Stephens, 2010, p. 41). This kind of positioning ultimately reinforces neoliberal anti-welfarist goals related to lower government spending (Katz, 2000).

Following neoliberal reform (and against the backdrop of apocalyptic demography), the provision of support for older people in 'developed' nations is managed through health and social care markets. This means that care for older people is no longer a need that is only met by family or the state. The provision of support is increasingly commercialised. As health care recipients, older people gradually became understood as consumers (Hurley et al., 2017). Social services for older people have undergone a process of 'clientisation' (Gilleard & Higgs,

2000), where aspects of older people's lives are categorised in terms of problems that can be addressed by professionalised state and private sector providers (Gubrium & Järvinen, 2013). Long term aged care has expanded from state and charitable entities primarily for low-income people, to a commercial service for all of those that could afford it (Greenbrook, 2005). The opportunities that older people have to meet their needs for care are heavily influenced by their economic circumstances (Kröger, 2022). Older people's lives and material circumstances are increasingly shaped by commercial institutions.

1.1.3 Consumption, media, and the cultural industries in older people's lives

In contemporary 'developed' nations, the identity of consumer now gives significant meaning to age (Gilleard & Higgs, 2000; Katz, 2001). An increase in material living standards post WW2, coupled with the rise of new media forms, saw a marked increase in industries related to leisure and self-care, encompassing sub-cultures, new exercise and diet practices, new sexual practices, and new sub-cultures (Gilleard & Higgs, 2014). For those born in the aftermath of WW2, identity through the life course has been shaped by these life-style factors, which are entwined with consumer practices (Gilleard & Higgs, 2014). The media and cultural industries offer images of age that are linked with consumption (Harington et al., 2014). Heavy private investment in sites of consumption (such as shopping malls in the 1990s and the online consumer infrastructure since the 2000s) has coincided with a decrease in investment in public spaces and service provision (Rees Jones et al., 2009). To adopt a socially validated aged identity, possessing a degree of cultural and economic capital to participate in these spaces is necessary (Gilleard & Higgs, 2000). Age is commonly understood in terms of lifestyle factors and signifiers, rather than as a series of chronological age markers (Katz, 2013). Whether or not a person is 'old' is now signalled by the presence of lifestyle signifiers, rather than a particular chronological age (Katz, 2001).

Policy responses that emphasise participation and consumption, cultural ideas about ageing, and media representations of age intersect to produce and understanding of age characterised by a 'third'/'fourth' age binary. The third age describes an extended period of middle age extending past retirement from paid work. The fourth age describes a period of bodily decline and dependence before death (Katz & Marshall, 2003; Loos & Ivan, 2018). Media representations of third agers emphasise health, activeness, sexiness, independence, career

success, and wealth (Katz & Marshall, 2003; Loos & Ivan, 2018). An extended period of older age is positioned as reflective of, and a reward for, a life lived prudently (Estes as cited in Angus & Reeve, 2006, p. 144). In contrast, media representations of fourth agers emphasise loss of autonomy, loss of cognitive and physical capacities, and the need for care and support (Loos & Ivan, 2018; Reul et al., 2023). Circumstances in older life are presented by media as a reflection of personal poor luck and poor choices (Gilleard & Higgs, 2010), rather than a final stage of life afforded morality and dignity. Media representations reflect how older people are socially perceived, but also impact upon the lived experience of age and how older people are treated.

1.1.4 Ageism

Ageism, prejudice and discrimination connected to age, can impact any age group. Forms of ageism that target older age are the most common (Iversen et al., 2009). Ageism involves negative constructions of older people by individuals, institutions, and society (Ayalon & Tesch Römer, 2018). Ageism is closely linked with cultural understandings of older people that position older people as burdensome and dependent. Ageism cannot be separated from an emphasis in 'developed' nations on productivity. When governments valorise citizens for economic potential and workforce participation, older people (as well as other groups who do not participate in full employment) are marginalised as unproductive, dependent citizens (Angus & Reeve, 2006). Ageism can be more difficult to identify than other forms of prejudice and discrimination (McNamara & Williamson, 2019). Notably, ageism has a strong visual component, exacerbated when older people are underrepresented or stereotypically or negatively represented in images that circulate through the media (Loos & Ivan, 2018).

As digital technologies become increasingly important in the organisation of everyday life, the forms ageism takes differ. Ageism, for example, animates the myth that older people are not able to use or learn to use digital technologies (Loos et al., 2022). More broadly, digital ageism refers to implicit or explicit forms of prejudice and discrimination of older people based on the representations and experiences of age as they relate to digital technology (Rosales et al., 2023). Those who design contemporary digital technologies such as social media platforms tend to be younger. This means that many of the technologies of everyday life are designed in ways that do not consider the experiences and diversity of older people (Rosales & Fernández-

Ardèvol, 2020). Notably, ageism has been largely ignored in studies of platform discrimination (Rosales & Fernández-Ardèvol, 2020).

1.2 Caring for older people: Responses to population ageing

One of the most significant outcomes of neoliberal approaches to ageing and the 'fear of a grey planet' (Higgs & Gilleard, 2022) is a powerful imperative for people to undertake self-care right through the life-course. Resisting the process of ageing is not just an endeavour of older people but a central component to many adult lifestyles and routines, including diet and skincare (Gilleard & Higgs, 2000). Taking personal responsibility for being healthy is one of the most important markers of self-care and good citizenship (Crawford, 2006). Preferred ways of ageing and taking care of oneself through the life course are disseminated through policy, media representations, and common-sense wisdom (Hepworth, 1995).

Moral ideas about how to be a good older person are strongly connected with health and selfcare. As discussed, policy and research related to ageing focuses on the need to 'age well', 'actively', or 'positively'. For older people, being physically, mentally, and socially active are predictors for individual and collective validation (Asquith, 2009; Hepworth, 1995). Ageing individuals are expected to engage in practices of physical exercise, eat well, give back through volunteering, and maintain a supportive network of family and friends. The representation of the fourth age constructs imagined futures of cognitive and physical decline that feedback and reinforce the importance of such lifestyle interventions.

The neoliberal framework through which contemporary ageing is understood obscures the way that age is shaped by the accumulation of advantages and disadvantages through life (Breheny & Stephens, 2010; Katz & Calasanti, 2015). While the socio-economic determinants of health are well-known (Estes & Mahakian, 2001), the dominant research and social policy paradigms for understanding ageing through frames of successful and active focus on individualised behaviour and responsibility. The lived experience of age is shaped by the different choices and opportunities individuals have had through their lives (Bülow & Söderqvist, 2014; Katz, 2013). People have differential access to economic, social, and temporal resources which shape their lifestyles (Katz, 2013).

Many older people will need support from other people at some point in their lives. Older people are not necessarily frail, ill, and/or in need of support. At the same time, increased age is associated with increased likelihood of disability and chronic illness such as arthritis or vascular disease (Williams & Cooper, 2008). There is estimated gap of seven years between healthy life-expectancy and life-expectancy (Fillmore Elbourne & le May, 2019). Approximately one in three people over 65 experiences at least one fall per year (Giordano et al., 2016). Older people are the group most likely to experience disability as a loss of functional capacities (Lay-Yee et al., 2017). These factors mean that older people are the group most likely to be receiving some form of care or support. Medical care is one component of this. Older people may also require assistance with the activities of daily living such as managing medications, showering, eating, drinking, elimination, and socialising (described as 'social' care). This care can be categorised as informal (provided by people who are known to the older person, usually unpaid, and non-professionalised), formal (provided by professional services and paid for by the state or private funds), and residential (where the older person lives in a facility for older people).

How much care an older person will need in their lifetime is varied. Some people enjoy relatively good health as they age, requiring negligible care. Other older people may need intensive support, but only for a short period of their lives. Some older people will experience later life as a time of significant and prolonged disability, and need significant medical care and support with activities of daily living (Lay-Yee et al., 2017). Differential life experiences are linked with differential care experiences. Material disadvantages through the life course shapes the need for care in older age. Women tend to live for longer than men but have poorer health in their final years and are more likely to live alone (Rodrigues et al., 2012). Māori, on average, live for seven less years than Pākehā (New Zealand European) and are more likely to experience disability and illness (Parr-Brownlie et al., 2020). As such, in Aotearoa New Zealand being a woman and/or Māori correlates with a greater need for social care.

While interdependence between one another is fundamentally a natural state of human existence, requiring care and support in older age is often spoken about in negative terms in Pākehā culture. There are age-graded ideas of normal functioning and those that fall outside of these bounds, requiring support from others, are coded as dependent (Holloway as cited in Long, 2012). Not wanting to be a burden, particularly on adult children, is a dominant frame from which many older Pākeha people approach their care needs. Ageing, and the provision of

support for people who are ageing, is culturally specific (Cahill et al., 2009). For Māori, the provision of care and the receiving of support are embedded in whānau values of reciprocity and obligation (Lapsley et al., 2020). Dependency on people and on place can be an enabler of freedom and autonomy for Māori (Butcher & Breheny, 2016)

Being in need or care and support is framed by 'developed' states as socially negative, shaped by culturally specific notions of independence. Independence is linked with requiring as little social care as possible. From the perspective of the state, interventions are seen as necessary to promote independence by preventing people from requiring social care (Fine & Glendinning, 2005). State provision of social care is costly. Because older people's requirements for care cannot be entirely avoided, policy interventions aim to alleviate the cost burden through interventions that minimise state spending on care and support for older people. In practice, this means that formal and informal care provided within the home are preferable to residential care.

1.2.1 Ageing in place

An important policy response to population ageing has been a shift toward an emphasis on ageing in place. Ageing in place is the term given to an ideology and suite of government and supra-national policies underpinned by the assumption that it is best for older people to remain in their own home for as long as possible (Milligan et al., 2009). Since the late 1980s in Aotearoa New Zealand, policy measures have aimed to reduce the demand for the residential nursing care of older people (Broad et al., 2011). Nursing home care is no longer seen as the most appropriate option for managing even the most complex conditions in the older person. They are considered as a very last resort (Vasunilashorn et al., 2012). In most cases, remaining in the private residence with the provision of home-based support services as necessary is seen as desirable. Home based support services can include support with activities of daily living and/or medical procedures provided by care assistants and nurses. In New Zealand, entry into state funded rest home based care is subject to meeting strict needs-based criteria and means testing.

While ageing in place is a fiscally conservative policy response, numerous studies conducted within New Zealand and internationally suggest that older people strongly prefer to grow old

in their own homes (for example Wiles, 2011; Wiles et al., 2012). The home is a significant component of identity (Severinsen et al., 2016). Having choices about where and how life is lived are deeply important to older people. Living in a private home is associated with a valued sense of independence, where individual goals and desires can be maintained even if support is needed with activities of daily living (Hale et al., 2010). However, government departments and researchers have long held concerns about the suitability of Aotearoa New Zealand's housing stock for older people (Howden-Chapman et al., 1999; Te Tūāpapa Kura Kāinga, 2023). Nursing home care is not desirable to older people, even as improvements to institutions providing nursing level care have progressively been made since the mid-20th century. Commercial retirement villages provide facilities that attempt to balance between independence and the provision of some support or security for those that can afford it. However, for some older people and their social supports, ageing in place is an experience of inadequate support (*Current state: Carers of people with health conditions or disabilities*, 2019).

One of the most significant problems associated with ageing in place, and demographic ageing more broadly, is an inadequate supply of care. Much of the support that older people receive with their activities of daily living is, and has traditionally been, provided by family and friends in informal arrangements in the community (Swain, 2018; Welfare Expert Advisory Group, 2019). Informal carers are most likely to be women (Kia Piki Ake Welfare Expert Advisory Group, 2019). Māori also have comparatively high experiences of informal care (Lapsley et al., 2020), even if they do not identify as informal carers (Kia Piki Ake Welfare Expert Advisory Group, 2019). Declining family size, women increasingly participating in the formal labour market, and decreased co-residence of multiple familial generations mean that there are fewer people who can provide informal support to older people (Colombo et al., 2011, p. 65). Since the late 20th century, changing conceptions of (Pākeha) self-hood as linked with individuality and self-fulfilment mean that familial expectations related to the provision of care and support to older people are changing (McPherson, 1993).

The supply of paid formal caregivers that can provide support to older people within the community is also less than required (Dale, 2017). This situation is expected to worsen (Dale, 2017). The available pool of paid carers is themselves ageing (King et al., 2012). Formal caregivers working in the community perform work that is potentially more emotionally challenging (Lovelock & Martin, 2016). This shortage of care impacts the material

circumstances of older people. It also exacerbates the sense that demographic ageing presents an impending crisis. Government policies are a key way that "the boundaries between family, state, and market" are framed (Daly, 2002, p. 254). How different care tasks are defined, delineated between actors, and made sense of by individuals of are shaped by these policies.

Older people's experiences of receiving care and support in the home are a notable site of inequality and can be disempowering. Poor continuity of care between primary and secondary healthcare providers, home support services, informal caregivers, and older people can cause problems for care (Gregory et al., 2017). Home support in New Zealand is often publicly funded and privately delivered. The state aims to keep the health care spend as low as possible. Private providers aim to maximise the limited funding given to them. This impacts how home care functions for older people. The short, task-based visits that comprise home based support can be perceived by older people as inadequate, undignified and impersonal (Kwan et al., 2019).

Care is a site where ageism is reinforced. Older people receiving home care can feel like their views are not respected and they are not adequately included in the development of care plans (Kwan et al., 2019). Ageing in place can make older people vulnerable (Waldegrave, 2014). Homes can be a site of conflict and tension (Wiles et al., 2012). There are tensions between idealised versions of ageing in the home and the realities of complex family relations (Wiles et al., 2012). Most concerningly, around ten percent of older people living in the community experience abuse (Waldegrave, 2014). Having low levels of social support and a need for assistance with activities of daily living is associated with a higher prevalence of abuse (Waldegrave, 2014). Experiences of ageing in place are complex, with varied impacts on older people's social and emotional well-being.

1.2.2 Social connectedness

Ensuring the 'social connectedness' of older people is an important component of ageing in place strategies. One of the ways the social connections of older people are problematised in policy responses is by linking together increased age and increased risk of social isolation and loneliness. Older age can be a time of emotional upheaval and change. Older people, for example, frequently experience disruptions to their social networks due to factors such as

children and grandchildren becoming increasingly independent, retirement, bereavement, and illness or disability (Alpass & Neville, 2003). These kinds of changes can result in social isolation, a decrease in the quantity or quality of social relationships and external supports (Alpass & Neville, 2003). Changes to social networks can also result in loneliness, the internal feelings related to a perceived decrease in the quantity of quality of relationships (Wright-St Clair et al., 2017).

Social isolation and loneliness in older people are a concern for governments because they are associated with higher mortality and disease as well as poorer physical and cognitive functioning (Milligan et al., 2009; Wright-St Clair et al., 2017). As a group those aged 65-74 report loneliness at rates lower than the general population (Wright-St Clair et al., 2017). People over 75 experience loneliness at the same rates as the general population (Ministry of Social Development, 2016). Older people are more likely than younger people to experience disabilities which can impact upon quality of life. Local decisions related to public transport, public spaces (such as libraries), spaces for recreation, and infrastructure (such as footpaths) all have a significant impact upon whether older peoples social, cultural, economic, and material needs can be met while ageing in place (Wiles et al., 2012). Policy initiatives aimed at increasing social connectedness can have tangible benefits for the well-being of older people when they are used as rationale for better kinds of decision making. At the same time, there are clear economic imperatives involved in the problematisation of older people's social lives.

1.3 Is technology the solution to crises of care?

The ageing population, desires for state austerity, and challenges related to caring for older people have led to significant public and private interest in digital technologies (Higgs & Gilleard, 2022). In public, policy, and academic discussions, new technologies are positioned as able to solve or mitigate crises connected to ageing and care. 'Connected ageing' (Centre for Technology and Aging, 2013) is a powerful vision that shapes how care of the older person is imagined in personal, policy, and private sector spaces. There are three main domains to connected ageing: health, social care, and social connectedness.

Digital technologies are imagined as being able to contribute to the health of older people and prevent the development of future disease or disability (Centre for Technology and Aging,

2013). Wearable devices and personal health applications will enable people right through the life course to take better control of their health. Central to this imaginary is the notion that such devices offer specific, personalised information about the bodies which can be used to support rational health decision making. Older people can use wearable devices and other applications (such as brain training games) to prevent physical and cognitive decline for as long as possible, reducing their need for medical and social care (Katz & Marshall, 2018). Technological developments that support people remaining in their own homes and that meet their medical, leisure, and social needs are seen as having significant potential to improve the well-being of older people while also being fiscally conservative (Marshall et al., 2022).

Secondly, digital technologies are positioned as being able to address the functional limitations of older people (Centre for Technology and Aging, 2013). In this way, it is hoped that digital technologies will foster reduced need for all levels of care and support. Telehealth applications will ensure that the health sector can effectively meet burgeoning demand for medical care. Robotics, sensors, artificial intelligence and other technological interventions are imagined as being able to provide solutions by replacing the need for human care labour in the home and in care facilities. It is argued that such technologies can reduce the physical risks associated with increased age (such as falls) while also detecting unusual behaviour associated with cognitive decline (Higgs & Gilleard, 2022). A significant strand of university research into gerontechnology (technologies designed specifically for older people) in Aotearoa New Zealand has focused on the development of robotics that will provide companionship and automation of tasks in both residential facilities (for examples see Broadbent et al., 2016; Ulset et al., 2022) and the community (for examples see Gasteiger et al., 2022; Liang et al., 2017).

Finally, digital technologies are imagined as enabling social connections between older people and their family, friends and communities (Centre for Technology and Aging, 2013). Rather than addressing physical infrastructure and the face-to-face provision of services, digital technologies are positioned as offering virtual social and economic opportunities. It is suggested that a novel form of 'connected autonomy' is made possible by digital technologies that can link together people, places, things, services, and events in ways that preserve the self determination of older people (Garcia et al., 2022). An emphasis on the way that such interventions support independence reflects that this a desired way of life, further constructing the need for support from other people as dependence.

Technological interventions for older people are positioned within the context of fear of demographic ageing and a desire for state austerity which renders them a necessary, obvious, and legitimate solution (Neven & Peine, 2017). The sociotechnical imaginary detailed above sets out descriptions of what technology makes possible for ageing, while simultaneously making normative judgements about desirable ways of life for older people (Jasanoff, 2015; Marshall et al., 2022). Globally, policy documents that discuss gerontechnology and technology use by older people are underpinned by the shared assumption that active ageing and ageing in place are particularly desirable ways of growing older (Marshall et al., 2022). These kinds of developments are normative in the sense that they arise from the assumption that one solution to the crisis of care is technological innovation, rather than other social policy changes (such as more flexible policies for informal carers or making residential care work more desirable through increased rates of pay).

Despite the intensity of the discussion of the potentials of high-tech applications, they are not yet widespread. Indeed, the conversations about technologies such as robotics and artificial intelligence almost outpace actual developments (Higgs & Gilleard, 2022). While policy documents broadly articulate the potentials of digital technologies, in Australia and New Zealand there is scant official government documentation related to how things like robotics should be 'rolled out' or governed (Dickinson et al., 2021). In supra-national and national documents, one of the ways that technologies to support ageing in place are framed is as inherently in line with older people's desires (Marshall et al., 2022). However, there are tensions between the values of older people and the functions of the technologies that are proposed and/or available.

Older people have been found to have varied concerns about the technologies that support ageing in place. Such concerns include the impact on privacy (Berridge & Fox Wetle, 2020) and reduction of face-to-face contact (Elers et al., 2018). There is a complex interplay between empowerment and disempowerment associated with digital technologies that has been evident for many years in the discussions surrounding 'lower tech' applications such as push-button alarms (Thornton, 1993). The push button alarm can offer older people new opportunities for independence and privacy, for example by reducing the need to have a support person present while getting dressed. At the same time, these kinds of gerontechnologies can act as a marker of frailty, making evident a person's functional losses and disabilities in a way that is

disempowering (Higgs & Gilleard, 2016; Higgs & Gilleard, 2022). For some older people, ageing in place is already a site of compromising and trade-off between values. 'Support' can be accepted begrudgingly by older people as a way to avoid needing to move into residential care (Rose et al., 2023). At the very least, these kinds of tensions and contradictions will need to be resolved before many of the imagined benefits for technologies can be fully realised (Higgs & Gilleard, 2022).

As these discussions and debates about imagined futures for ageing and technology continue, older people in Aotearoa New Zealand are increasingly making use of widely available consumer technologies. The Aotearoa New Zealand government estimates that at least 75% of people over 65 are internet users (Te Tari Kaumātua, 2023). Māori, Pacific peoples, those on lower incomes, and the very oldest people are more likely to not be internet or cell phone users. For example, based on 2010 data, it has been estimated that approximately six percent of Māori aged over 80 and 19% of non-Māori over 85 used the internet, and 16% of Māori aged over 80 and 23% of non-Māori over 85 used a cell phone (Atlas et al., 2020). In 2019, it was suggested that 60% of people over 75 were internet users (Grimes & White, 2019). Notably, in a survey of people aged over 50 in New Zealand, it was found that 90% had increased their internet usage since the beginning of the pandemic (New Zealand Seniors, 2022). These different figures suggest that for growing numbers of older people, technologies are a part of life and shape the experiences of ageing (Peine & Neven, 2021), self-care (Marshall & Katz, 2016), and care. In this way, use of everyday technologies likely reflects a response to the individualised responsibility for care that has arisen from neoliberal policy and ideology.

The purpose of this research was to explore how older people in Aotearoa New Zealand are using digital technologies. Because one of the core imagined benefits to technology uses for older people is that it will support ageing in place, the research question was limited to focus on older people living in the community. Similarly, the notion that digital technologies will support care for older people is central to sociotechnical imaginaries surrounding connected ageing. In a context where technology is often uncritically promoted as a straightforward solution for care, this research is timely and salient.

The question this research answers is:

How does digitally mediated care function for community dwelling older people in Aotearoa New Zealand?

Digitally mediated forms of care can encompass aspects of medical care and health, social care, and self-care. Digitally mediated medical and health care includes activities such as maintaining relationships with medical professionals and the management of disease. Digitally mediated social care concerns the ways that technologies are part of supporting older people with their activities of daily living, encompassing the myriad ways technologies can support remaining in the home. Finally, digitally mediated self-care is connected to the ways that technologies are involved in older people's responses to the powerful imperative to self-care connected with neoliberal policy and apocalyptic demography. For example, in exploring digitally mediated self-care I was interested in the ways that technologies help older people maintain 'independent', 'socially connected' identities. Rather than separate, these different aspects of digitally mediated care are entwined. Notably, older people are not just cared for but also perform vital caring roles: for themselves, for spouses, for their own ageing parents, for adult children, for siblings, for grandchildren, for whānau, for friends, for communities and for places.

1.4 Thesis outline

This research provides an exploration of how digitally mediated care functions for community dwelling older people in Aotearoa New Zealand. I demonstrate that connection is a core value that underpins how digitally mediated care functions. Connecting for care has affective and practical dimensions. Independence and good self-care can be demonstrated by being able to use digital technology to manage connections. However, the technical architecture to realise the imagined benefits of digitally mediated care is often lacking. Frequently, the priorities of older people are not reflected in how sociotechnical care network's function. The overall contribution made by this research is the development of the concept of connected older citizenship.

In the following chapter, a review of literature related to care, age, and technology from media and cultural studies, science and technology studies, and the inter-disciplinary field of sociogerontechnology is provided. The chapter describes what is known about digitally

mediated care, describing how networked, digital technologies make new forms of care possible. This care can be empowering and meaningful, giving people more control over their health and new ways to improve their well-being through opportunities for social contact. However, the chapter highlights the inequalities associated with care, age and technology. Digitally mediated care has been constituted in ways that map closely onto ideas about active ageing and the third/fourth age binary. Digitally mediated care is concerned with quantification and surveillance of older bodies, behavioural prediction and the elicitation of healthy forms of ageing, as well as the individualisation of responsibility.

The theory chapter introduces the theories that inform the thesis ontologically (as an explanation of how the world is) and methodologically (informing the approach to methods and how the data collected and analysed). Actor-network theory has been used as the main theory, with critical political economy as a supplement. This chapter offers definitions for key concepts that have informed the analysis, such as 'sociotechnical care network', and explains how power and agency have been understood.

The methods chapter explains the core methods and modes of analysis – interviewing, observation, document analysis, network mapping, interface analysis, thematic analysis. The chapter gives a description of the process for gaining ethical approval, recruitment of participants and characteristics of the study cohort, as well as the collection and analysis of data.

This research has four analysis chapters. When sociotechnical care networks were functioning well for participants, a sense of connection and independence was generated. Because these experiences were so important to care for the participants, the first two analysis chapters are organised around these themes. The first analysis chapter 'Connection as care and complexity' highlights that connection as care is a core digitally mediated care practice. The importance of connection as a form of digitally mediated care was highlighted by the state in policy documents, in technology marketing, and in the participants discussions. Maintaining connections took significant work for participants. Connection as care displaces the responsibility for older people's wellbeing to the older person and their family and directs older people's behaviour in commercially beneficial ways.

The second analysis chapter ‘In/dependence as a sociotechnical care network builder’ highlights the tensions between dependence and independence that characterise how digitally mediated self-care functions for the study participants. The chapter describes how ways of using technology that enacted a sense of independence were valued and ways of using technologies that were coded as dependent were devalued. Appearing to be an independent older person requires having the skills to use a range of digital technologies to manage connections between the self, the home, other people, as well as a range of other institutions and actors. Succeeding in managing these connections was understood as good self-care. Conversely, failures to manage these connections could impact upon well-being.

The third analysis chapter ‘Digitally empowered patients?’ analyses the dynamics of care networks that form between technologies, medical professionals, and study participants. Empowerment is a rhetoric often used to describe the potentials of care technologies. In practice, digitally mediated care technologies like self-tracking devices and patient portals had varying effects. The chapter highlights two significant ‘empowerment gaps’. Firstly, the imagined benefits of patient portals far exceeded the benefits experienced by study participants. The functioning of the portals at times even limited the possibilities for the participants’ care. Secondly, there was a gap between the ‘empowered patient’ and social imaginaries related to older people and imagined futures of decline. The empowerment gaps together highlight that digitally mediated care is often not set up to benefit older people.

In the final analysis chapter ‘The temporal dynamics of sociotechnical care networks’ I explore time in relation to sociotechnical care networks. Digital technologies provided participants with new ways to manage their time, but also presented new challenges to the maintenance of time. Routine and the complexity of saving time are discussed. The chapter highlights the work participants did to manage their time in sociotechnical care networks and highlights new ways that older people are devalued based on their time use. The chapter highlights the ways that older peoples care networks are connected to larger political economic flows.

In the chapter ‘Connected older citizens’ I offer a discussion of the political identity that digitally mediated care practices enact. I advance the notion of connected older citizenship, as a way to think about more than human, networked citizenship in relation to older people. Connected older citizenship has policy, commercial, health, temporal, familial, and community

dimensions. It is a way of encompassing the new responsibilities for older people that arise in sociotechnical care networks, including new obligations to manage connected presence and new forms of surveillance. I suggest that compelling older people to connect expands the ageing enterprise as their connections are commodified. The thesis concludes with recommendations for how the figure of connected older citizenship can be used to explore older people's digital labour on care platforms and perspectives of socially and environmentally just care with and for technologies.

2. The mutual shaping of age, care, and technology

Existing critical literature that explores digitally mediated care challenges the sociotechnical imaginary that posits that technological interventions will realise human goals by offering efficient, straightforward solutions for care of ageing populations. Technological development and ageing populations are fundamentally constitutive and entwined. That populations of people are living longer, at least in part, reflects the changing living conditions enabled by modern technologies (Moreira, 2017). In this way, technology is never *just* a solution for ageing societies.

In conceptualising and studying digitally mediated care and age this thesis draws upon three main bodies of literature: sociogerontechnology, media and cultural studies, and science and technology studies (hereafter, STS). While many academic fields study digitally mediated care and age, locating this work at the intersections of these fields means that age, care, and technology are presumed at the outset to be constitutive. This chapter outlines the complex ways that the experience of being an older person in need of care is constituted by digital technology. Data intensive technologies lead to new forms of classification and surveillance of older bodies. Social media leads to new ways that care and intimacy are experienced. I show that care makes both age and technology possible. Recursively, how technologies develop are shaped by ideas about age and care.

2.1 Critically approaching digitally mediated care

In STS literature related to age, care, and technology, two significant strands of analysis have developed. One foregrounds how technologies are implicated within social, economic, and political arrangements in ways that disempower older people. The other explores the creativity and agency of older people ageing with technology. Exemplifying the first approach, Mort et al. (2013) have critically explored telecare for older people in the United Kingdom. Telecare involves a wide range of digitally mediated care interventions including remote monitoring systems that can utilise web cameras, motion detectors, sensors, and alarms (Milligan et al., 2011). Telecare can also involve technologies designed to combat social isolation, such as robotic pets (Milligan et al., 2011).

Mort et al. (2013) highlight that many telecare interventions are developed and used within funding contexts shaped by the desire for fiscal austerity. This means that in practice, telecare technologies are often only funded and accessible for those with high levels of need. Demand for other options for care that might be more suitable in these instances, such as long-term care, often exceeds supply. Under these conditions, telecare has significant potential to be coercive. There is little opportunity for older people to exert their own preferences and wishes related to digitally mediated care. Drawing upon actor-network theory, Mort et al. (2009) showed that as telecare applications were introduced, limited roles were designed for patients. Paradoxically, as this digitisation of care was taking place and patients were being marginalised, a framing of 'patient centred care' discursively positioned the patient at the centre of the relationship.

While rhetorically digitally mediated care interventions are positioned as offering desirable solutions for older people, the reality is that in the context of the neoliberal state such interventions can be disempowering. Lolich and Timonen (2022) demonstrate that co-creation initiatives attempt to enlist older people to become 'ageing entrepreneurs'. They argue that the older person is called upon to participate in initiatives to design new technologies. This kind of positioning works to govern older peoples conduct, encouraging them to think of themselves as invested in the enterprise of ageing well. Like Mort et al. (2013), Lolich and Timonen (2022) suggest that in practice the extent to which older people can actually participate in the process of developing care technologies to meet their needs is heavily circumscribed. Even when older people are included, there can be significant tensions between the priorities of designers, funders, and other parties and those of older people (Berridge, 2017).

In contrast, other research about how digitally mediated care functions has focused upon the agency of older people. Loe (2010) developed the term 'technogenarian' to explain the creative ways that women in their 90s ageing in place in upstate New York use digital and analogue technology for self-care. Loe took older women's lives as a starting point for exploring how a range of high and low technologies were used. She demonstrated that these women used, modified, and rejected many technologies to support ageing in place. These technologies included traditional telecare such as push-button alarms as well as domestic technologies such as slow cookers and telephones. Loe's research highlights that older people are significant actors that shape how digitally mediated forms of care function for themselves, as they use, create, and negotiate their well-being (Joyce & Loe, 2010).

These two different strands make the situated nature of how digitally mediated care functions evident – which technologies, in which contexts shapes how digitally mediated care functions. Technology has a range of effects for care (Mol et al., 2010). Pols (2012) studied telecare technologies used in palliative care and the management of chronic disease. She found that these technologies were not necessarily opposed to good care. However, nor did they offer straightforward benefits for care. Pols' work highlights that how digitally mediated care functions depends on whether 'fits' between people and technology can be achieved in order to elicit particular effects. Studying digitally mediated care requires an approach that can be attuned to the situated, variable, oftentimes contradictory ways it functions. A body of STS that has been informed by Age Studies has developed to theorise these kinds of complex relationships between age and technology.

2.2 Sociogerontechnology: Age and technology as co-constitutive

Sociogerontechnology studies technologies specifically designed for older people (such as home monitoring systems, wearable alarms, or smart home applications) as well as everyday technologies (such as smart phones or fitness watches) used by older people. Peine and Neven (2021), two scholars who have greatly influenced the shape of this field, argue that age and technology are fundamentally co-constitutive. Rather than approaching technologies and older people as distinct, bounded entities, in sociogerontechnological approaches, a-priori differences between material, technical and social worlds cannot be presumed (Peine & Neven, 2021). Sociogerontechnology is well placed to study the multiplicity of ways that digitally mediated care can function. The field rejects a binary approach to technology as something 'good' or 'bad'. A focus on digitally mediated care as emergent and comprised in material-social-technological relationships allows for acknowledgement of the ways that digitally mediated care is situated and contingent. The purpose of focusing on the interactions between older people, technologies, and other actors is to explore the ways that technologies make new ways of being older and of caring possible while foreclosing others.

For example, Urban (2017) has used sociogerontechnology as a frame to analyse three digital health practices (self-tracking with commercially available devices, monitoring illness using specialised devices, and ambient monitoring systems in the home for self-care). She argues

that how interactions between social, technical, and material actors open up and close down possibilities for older people is shaped by inequalities based on class, gender, race and ability. An older person who has worked in physical, working-class jobs for most of their lives may have been subjected to physical stress through the life course and have access to less economic resources than a professional worker, making them more likely to need care. They may have less experience of technologies at work for familiarisation and less capital to purchase expensive devices such as fitness watches. These factors will shape how the experience of digitally mediated care unfolds, closing off some potentialities which could have contributed to older people's well-being (Urban, 2017).

A strand of research within sociogerontechnology has explored how dominant meanings about age shape the development of technology. How gerontechnologies are funded, designed, and marketed is influenced by ideas about age (Peine & Neven, 2021). These ideas are embedded as 'scripts' for users into technologies (Akrich, 1992). Scripts "function like movie scripts" – they set out roles for the actors and prescribe what each character will do (van Hout et al., 2015, p. 1208). This strand of research highlights that even when it is accepted that older people have diverse levels of technical skills, when technologies are designed for older people, 'no skill' is often assumed as the default. In practice, this leads to the deployment of technologies with minimal spaces for older people to interact and influence the interface. The user is thus encoded as passive (Neven, 2015).

In turn, design practices do not just produce technologies but also produce and reinforce ideas about older people (Peine & Neven, 2019). Cozza et al. (2019) argue across private sector, state, and research imaginaries, older people are constructed as vulnerable and as desiring independence. Neven (2015) suggests that it is presumed self-evident that all older people want to remain in private homes as long as possible so technological interventions that support this are desirable and likely to be funded. Neven also argues that gerontechnology developers understand older people are being willing to trade privacy for such independence. Technological interventions are justified through policy goals for older people such as ageing in place (Neven, 2015), active ageing (Lassen & Moreira, 2020), and social connectedness (Cozza et al., 2019).

Taking a sociogerontechnological approach in conjunction with critical gerontology, feminist technoscience, as well as sociology of the body, Dalmer et al. (2022) argue that in technical care relationships, human and non-humans constitute each other in particularly neoliberal ways, reproducing many of the dynamics highlighted by earlier literature such as Mort et al. (2013) discussed above. Further, these technologies increase the visibility of the body, encouraging older people to adopt new practices of self-care such as self-tracking to obtain valorised active lifestyles. These findings highlight the utility of sociogerontechnology to explore how digitally mediated care functions for older people without losing sight of important power dynamics.

Emphasising this, Gilleard and Higgs (2021) draw upon the Latourian concept of actant-assemblages to interrogate gerontechnologies. They show that in the interrelations between older people, technologies, policy, care providers, and spaces, a utopian/dystopian duality emerges that maps closely to the imaginary of the third and fourth ages. Applications such as brain-training apps and senior dating sites are targeted at older people, but the presumed user is a consumer seeking to improve their life. In contrast, an in-home monitoring device emphasises and addresses a user presumed to be in a state of physical or cognitive decline. For the authors, the former types of technologies reflect and construct an active third age by extending the capacities of the older person. The latter group, however, work to limit the human agency of the older person, turning their users from capable 'I's improving their lives to vulnerable 'you's' being monitored (Gilleard & Higgs, 2021).

Nascent work in this field brings a range of different theoretical approaches to demonstrate the different ways that technology shapes what it means to be old and receive care. Drawing upon Barad's notion of agential cuts, Cozza (2021) draws on studies of the design phase of a wearable technology for falls detection and the implementation of a surveillance technology in the private homes of older people. She shows that in the interactions between the technologies and their functioning with spatial and human actors (including developers and care staff), agential 'cuts' were made foreclosing some possibilities for care and opening up others, producing a distinct experience of 'elderliness' marked by disempowerment for those subject to the technology.

Urban (2021) also draws upon Barad, in conjunction with the notion of 'topography' from human geography. She argues that ageing in place can be productively understood as an emergent phenomenon by analysing how spaces, technologies and humans are entangled to produce new forms of agency. Giving the example of activity or health monitors, she demonstrates that these technologies produce new relationships between the body, technology, and the home ultimately creating new spatial and emotional experiences. For both Cozza and Urban, experiences of age and care are produced in the complex interactions between the spatial, technical, and social. These studies emphasise that digitally mediated care is not just about bodies and technologies, but also particular kinds of spaces. The sociogerontechnology perspective is useful for situating human-technology interactions in broader relations. How digitally mediated care functions, that is, depends on more than just humans and technologies.

The over-arching 'call' made by sociogerontechnology is for situated and detailed studies of how technologies are used by older people (Peine & Neven, 2019), but also of those that care with and for them (Katz, 2021). As Dalmer et al. (2022) have argued, digitally mediated care can further unequal, gendered relations in care by placing further temporal demands on formal and informal caregivers (often women). The lack of recognition of the work that goes into making technologies for care work is often unrecognised, which exacerbates pre-existing inequalities (Dalmer et al., 2022). Schwennesen (2021), studying dementia care workers in Denmark, highlighted this in practice, demonstrating how a robotic seal used as a tool for companion and pleasure required many new tasks for care workers (such as washing the fur). The introduction of the seal also caused many practical challenges regarding how to actually use the technology with people who were often very unsure about its purpose (Schwennesen, 2021). A particularly notable finding by Schwennesen (2021) was that these workers would draw on everyday technologies such as smart phones to engage in different practices such as playing music as a way to respond to emergent situations based on what the older person needed in the moment. There was a stark difference between the creative uses of these technologies and the comparatively rigid experiences with the gerontechnology. This latter example highlights the benefits of an open-ended approach to the site of study – focusing just on the implementation of the seal would have missed the richness of the digitally mediated care practices that were occurring.

This research is my attempt to meet this call, offering a detailed study of how digitally mediated care functions for community dwelling older people in Aotearoa New Zealand. To better

understand the ways that age, technology and care are co-constitutive, I will draw upon literature from STS, media and cultural studies, and sociogerontechnology. There are two main benefits of this approach. Firstly, the two former fields have long traditions of recognising both media technologies and users as agentic and situated in broader material contexts, developed across a number of sub-disciplines. Secondly, work within these fields can be used to explicate how ageing constitutes technology.

So far, I have overviewed sociogerontechnology to highlight how meanings related to age shape how technologies are developed. Expanding on this, the ways that older people use technologies shape how they function and the effects they have. Further, material gerontology has drawn attention to the way that ageing is not a process reserved for humans (Sawchuk, 2018). As Sawchuk (2018) highlights, the materialities that produce age also age themselves: clothes become worn out, objects break, and technologies become dated. Katz (2005, p. 233) explains:

> "We are surrounded by fascinating and divergent temporal conditions, from the deep time of the earth's geological eras to the micro-lifespans of cellular species [which] should inspire us to think of ageing as encompassing biological, geological, historical, and cosmic spheres".

Media and cultural studies, like STS, offer tools for the exploration of the temporal conditions of digitally mediated care and ageing. In this way, we can garner a better understanding of how age constitutes technology as well as expand the argument to see how age, technology *and care* are mutually constitutive.

2.3 The agency of technology

Media and cultural studies and STS have rich traditions of positing that technologies are agentic and need to be considered in their broader material contexts, which can be drawn upon here to help further the argument that technology constitutes ageing and care, while sketching what is known about digitally mediated care. In media and cultural studies, the idea that media technologies themselves are an agentic actor that can influence the shape and form of human affairs is most famously associated with McLuhan's famous dictum "the medium is the message" (McLuhan, 1994, p. 7). Kittler extended McLuhan's argument, drawing on Foucault, to argue that the material form of a technology dictates the kind of information that it can

collect, analyse and disseminate. This means that it is media technologies that control how knowledge can be made (Kittler, 1990, 1999). These kinds of approaches were critiqued as being too simply technologically determinist. Responding to McLuhan, for example, Williams (1990) pointed out that a number of social factors are influential in determining what kinds of technologies are made and how they are used.

Contemporary work within MCS takes a 'softer' determinism approach, often drawing upon new materialist and/or post-humanist perspectives. One example of this softer determinism is actor-network theory (hereafter, ANT). Originating in STS, the ANT approach focuses on what bodies do to one another in multi-temporal, multi-spatial assemblages called networks. A technology can be conceived of as a network of material and discursive actors that have been organised in a particular way so as to elicit a particular effect, and then black-boxed (that is, the interactions between the network that make the machine work as it does are obscured, and it appears as a stand-alone entity with inputs and outputs) (Latour, 1999, p. 304). ANT approaches reject the idea of a distinction between subject/object, technology/user, technology/society (Spöhrer, 2019, p. 4) since the effects arise from interactions between diverse human and nonhuman actors including users, materials, designers, environments, and discourses, amongst others.

ANT has been productively taken up in media and cultural studies to explore the relationship between care and media. For example, Lin and Yang (2021) describe the smart phone as a key actor in the formation of 'digital disability care actor-networks' for disabled people living in China. The smart phone made connections with a number of other actors including devices worn on the body or in the home, with important people through social media, and with vital information about COVID. This capacity to make connections enabled a different kind of life for study participants, opening up conditions of possibility. At the same time, for the researchers, the ANT approach made visible notable connections that were not made through the smart phone, such as with government and NGO actors as well as particular kinds of connections that were not possible for some participants based on how their disability meant they used the smart phone. In these instances, the possibilities for participants were limited. The soft determinism the ANT approach embodies considers both technical capacities and social factors that shape the experience of disability. These kinds of approaches do not discount the roles of political, economic, and social factors but pay attention to the way that the material qualities and affordances of digital devices configure what is possible.

2.4 Material affordances of technologies configuring age and care

The material affordances of digital technologies play a configuring role in the neoliberal imaginaries that govern older age and shape care. In the latter half of the 20th century, computing technology was a site of intense economic interest and development. Similarly, there was significant investment by the US Department of Defence into developing the capacity for discrete devices to communicate via information-sharing networks. This investment culminated in the contemporary internet – a series of computing devices that have been interconnected by radio-waves, fibre optic cables, exchange points, cellular towers, data servers, and satellites (Creeber & Martin, 2009). This meant that progressively larger amounts of information could be collected, stored, and analysed by individual devices as well as communicated across vast distances in real time.

The contemporary internet is heralded as playing a contributory role in transforming social and economic practices. The significantly increased ability to generate and process data has altered how phenomena are understood and governed (boyd & Crawford, 2012). Systems of measurement are increasingly important at all levels of society (Beer, 2016). In state and commercial decision making, there is an increasing emphasis on predicting and eliciting behaviours (Zuboff, 2018). Digital technologies interact with environments to transform how spaces function (Kitchin & Dodge, 2011). Older people live in societies characterised by significant technological development and electronic media diffusion, with processes of computation central to most aspects of life (Andrews & Duff, 2019). These transformations have influenced how experience of age and contemporary care of the older person function. In 'developed' nations such as Aotearoa New Zealand, state and commercial actors foreground digital care interventions that emphasise the quantification and surveillance of the body, individuation of responsibility, predicting and eliciting behaviour, as well as the connected home.

2.4.1 The datafication of age and care

Advances in technology have meant that the functioning of the older body can be studied right down to the molecular level while also compared across massive data sets. These abilities to

collect and analyse large amounts of data have provided entirely new ways to know the older body (Lupton, 2015) in terms of 'quantified ageing' (Marshall & Katz, 2016). Data refers to the raw material that is produced when the world is rendered into categories, measurements, or other forms. Data then forms the building blocks of information and knowledge (Kitchin, 2014). Digital technologies equipped with sensors, motion detectors and other features can collect data about older people's bodies. Digital technologies connect this information about older bodies with much larger flows of information across devices, people, populations, literature, marketing (Katz & Marshall, 2004).

Ageing and care can be said to be continually undergoing a process of datafication. Datafication refers to the "the transformation of human life into data through processes of quantification and the generation of different kinds of value from data" (Mejias & Couldry, 2019, p. 3). As this definition suggests, there are two elements to datafication. Firstly, aspects of social and material life must be arranged so that data can be collected (van Dijck, 2014). Data does not just exist, it is created through a process of abstraction (Mejias & Couldry, 2019). Datafication involves aspects of older people's lives and care that have previously been unquantified being rendered into data (Ruckenstein & Schull, 2017). Older people and their care workers need to conduct themselves in particular ways so that this data can be collected (for example, by rearranging the home so that a monitoring device can be installed). Secondly, data requires mechanisms for sense making and for extracting value. In the context of age and care, the ability to understand the ageing body around numerous data points and comparisons configures the neoliberal imaginary for care of the people around a logic of functionality (Katz & Marshall, 2004). A focus on 'normal' states is replaced by a focus on what older people can do, which underpins the emphasis on state enablement and the individual responsibility of older people to self-care and be active (Katz & Marshall, 2004).

As new ways of quantifying age become possible, new frontiers for ageing to be made profitable (Gallistl & von Laufenberg, 2023) open up concerned with an emphasis on prediction, elicitation, and surveillance. A significant way that data is made valuable is through making predictions about future behaviour (van Dijck, 2014). One of the implications of quantified ageing is that data is presumed to represent self-evident facts (in this case, about the ageing body) and can thus be used to make predictions related to how older bodies need to be cared for (van Dijck, 2014). These kinds of predictions can be sold or circulated through commercial spaces (Mejias & Couldry, 2019), used by individuals, and/or used by

governments concerned with the ageing population (Oxlund & Whyte, 2014). Marshall (2018) argues that the commercial self-tracker such as the Fitbit positions the relationship between the older body and data distinctly in terms of prediction. The imagined benefit of such devices for older people is that data generated about things such as heart rate will enable them to notice changes in the body, predicting future declines in health or the onset of illness.

A pertinent example of datafication in Aotearoa New Zealand's home care sector can be found in the assessment tool for older people requiring publicly funded care services in the community, InterRAI. This tool ascertains "a person's level of need', "develop(s) a care plan" and identifies "appropriate services and support options" (Schluter et al., 2016, p. 350). These assessments become part of a large data set used for "planning and research purposes" (Schluter et al., 2016, p. 350). Here, the needs of an individual older person are measured and transformed into data. Calculations are made to determine how much care the individual is likely to need in the present, as well as in the future based on presumed trajectories of their illness. In the form of aggregated data, the measurements can circulate through university, commercial, and governmental organisations. In this form, the data informs planning decisions made by government actors as well as commercial actors (including companies designing technologies for older people, and the profit and non-profit organisations that are contracted to deliver home care) about what kinds of services will be developed and funded. In this process of circulation, such measures become cut off from their origin (Desrosières, 1998). At the same time, these circulations shape the possibilities for care of the older person into the future (Beer, 2016).

2.4.2 Older people as active data producers

The increasingly accurate and specific information about the body that digital technologies affords both reflects and engenders the presumption that older people and their supports will act increasingly rationally (Moore & Hayes, 2018; Petersen, 2019; Prainsack, 2018b). Data about older people's bodies, as it is circulated and made sense of, is also used in attempts to elicit future behaviour (Zuboff, 2018) around the ideals of active ageing. Older people are expected to become active in transforming their own bodies into data as a way of maintaining their status as active agers. In this way, digital technologies have made older people and their supporters responsible for care in new ways.

New idealised ways of care and self-care are normative and based in the kinds of practices it is possible to quantify (Ball et al., 2016). There is strong emphasis for older people on movement and particular forms of nutrition (Gallistl & von Laufenberg, 2023). One reason that older people take up self-tracking is that they are 'pushed' by another actor (Lupton, 2014) such as an adult child or doctor, as a way of encouraging them to be more active or to eat better. Self-tracking, as a care practice, encourages older people to think about their activity levels in a quantifiable way – in terms of steps taken, distance walked (Marshall, 2018). Similarly, a predominant digital care practice that older people (and people in middle age who will 'become older') are encouraged to adopt is use of nutrition apps. The imaginary of such apps is that they will encourage people to change their behaviour by adopting a healthier diet and lose weight (Baer et al., 2022). In each case, how decisions are made about movement and diet are shaped by what it is possible to record. Exercise is approached in terms of movement to elicit a particular feeling. Food is approached in terms of calories or nutrients instead of texture or pleasure. This reflects that the digital mediation of care and self-care change how care and self-care function.

For individuals, self-tracking as a digitally mediated care practice impacts how care functions because bodily insights and intuitions can now be located outside the body itself (Smith & Vonthethoff, 2017). Self-tracking means individuals have to make sense of data about their bodies. The way that this data is spoken about in marketing and policy discourse confers it with authority, which can put it in tension with bodily feelings (Lupton, 2016). The data speaks to the 'reality' of the body which is used to make moral judgments about whether a person has been good or bad in performing healthfulness (Lupton, 2016). This is reflected in the array of emotional responses studies of the general population associate with self-tracking: from a sense of being cared for, alongside anger, guilt, worry, frustration, pleasure, shame, relief, sadness, and excitement amongst other things (Lupton, 2019). While critical studies of self-tracking in older people are comparatively rare, Marshall (2018) in a small study of older users found that the devices offered reassurance of their activity, external confirmation that the participant embodied healthy ageing.

2.4.3 Dataveillance

Datafication has exposed older people to an intensification of surveillance practices. The relationship between data-intensive technologies and surveillance has been referred to as dataveillance (van Dijck, 2014). The term was proposed as a way of a distinction from surveillance originating from a singular source ('above') (Ruckenstein & Schull, 2017). Dataveillance involves continuous monitoring distributed across a host of different actors (Ruckenstein & Schull, 2017) from older people themselves, care givers, doctors, home care providers, analytics companies, security companies, and so on. Gerontechnologies such as home monitoring systems as well as wearable consumer devices like fitness watches used by older people sense, track, and quantify older bodies and store that information as data. Dataveillance is often concerned with prediction. A home monitoring system might, for instance, track patterns in an older person's movement to predict a future adverse health event.

Mort et al. (2020) draw a useful distinction between self-tracking practices and 'dys-tracking' practices. Self-tracking practices see older people actively generate and manage data themselves using technologies such as smart watches, apps to log food intake, or devices like insulin monitors. Through these kinds of technologies new agencies can be delegated to older people (Oudshoorn, 2011). Having more information about the body means that digitally mediated care can open possibilities for older people. In contrast, dys-tracking practices refer to the passive monitoring of older people, where they have no control over when data is collected or how the device is used (Mort et al., 2020). Examples include geo-fencing wearables for people with dementia or home monitoring systems that detect for falls. It is notable with regard to dys-tracking that the watcher is not necessarily human. Patterns can be detected by an 'algorithmic eye' (McQuillan, 2016) and/or by artificial intelligence (Berridge & Grigorovich, 2022). The use of such technological interventions in other contexts are strongly associated with the reproduction of bias related to race and ability. The 'algorithmic eye' and automated forms of monitoring present a serious equity challenge for both older people and care workers (Berridge & Grigorovich, 2022).

The numbers generated by a self-tracking device may purport to reflect the status of an individual body, but they are always fundamentally relational (Neff & Nafus, 2016, p. 2). Mort et al. (2020) point out that older people bodies are always entangled with their surrounding environments – with people, with assistive technologies, with homes. The sensors in a home monitoring system, for example, collect and acts on a wide range of data that does not necessarily pertain only to the older body but capture information about objects, spaces, pets

and care givers. Further, any data a self-tracking or dys-tracking technology generates is made possible because of relationships between manufacturers, materials, technologies, users, caregivers, clinicians and other stake holders (Neff & Nafus, 2016). Any notion of personal technologies is in tension with the relational nature of human experience (Prainsack, 2018b).

Older people have caregivers, spouses, friends, and family that use technologies with them. Together, these actors ensure technologies are functioning and charged, used correctly, notifications are acted on, information is made sense of and so on (Dalmer et al., 2022). Further, installing and maintaining home care technologies involves labour which sometimes necessitates skilled professionals (López-Gómez & Sánchez Criado, 2015). These kinds of relationalities and practices exemplify the co-constitution of age, care, and technology. Boundaries between technology/user/carer are porous and defined in interactions.

2.4.4 The connected home

Central to the visions of digitally mediated care for older people that circulate is the connected home. How ageing in place develops as a neoliberal policy and practice that responds to ageing is shaped by the affordances of digital technologies. Digital technologies make it possible for the home space to become embedded in real-time flows of information (Kitchin & Dodge, 2011). Older people's activities in the home, once considered a private space, can be monitored by a host of other actors (Kitchin & Dodge, 2011) including adult children, medical providers, and corporations. This monitoring is not always visible to those being observed.

Being positioned in these flows of information produces new kinds of spaces. Digitally mediated care practices that enable ageing in place such as falls sensors or self-tracking devices blur previous distinctions between clinical, commercial, domestic spaces and practices (Hogle, 2016; Neff & Nafus, 2016; Sharon, 2015). Technologies that support ageing in place require homes to be configured in specific ways so that they can function (Willems, 2010). These devices bring high-tech applications and levels of monitoring that were once reserved for nursing level care into the home (Fox, 2017). The home fitted out with sensors and gerontechnologies can become a liminal space between home and long-term care (Mort et al., 2020).

Digital technologies configure the spatial organisation of care for older people as well the affective experience of the home at the centre of ageing in place. Milligan has argued that rearranging home to fit such technologies can make the home feel less homely (Milligan et al., 2009). These technologies 'circumvent the door' and erode the status of the home as a private space (Milligan et al., 2010). Conversely, connecting the private home to other locations can enhance a sense of homeliness for those ageing in place. Through digital technologies, particularly those with video capacity, a sense of strong connection to family in other locations is engendered (Cabalquinto, 2018a; Madianou & Miller, 2013). Whether and how the connected home feels like a home depends upon the particular kinds of caring relations that connect it.

Decisions about how older people's homes should be connected for care can be contentious. Berridge and Fox Wetle (2020) interviewed care dyads comprising older people and an informal carer, often an adult child. They used vignettes about location tracking devices, sensor systems, and cameras to be used in the care dyads (enabling a continuous, background awareness of the other party). Privacy was a core value identified valued by both parties, strongly linked with other values such as independence, freedom and identity. Yet, the kinds of connections with other values and trade-offs that were perceived as acceptable differed based on position within the care dyad. Older people understood their independence to be at stake when compromising privacy for a technology that enabled monitoring. In contrast, carers felt the improvements to health and well-being these devices could enable was an acceptable trade-off for privacy (Berridge & Fox Wetle, 2020).

Data intensive technologies used by older people and the general population do not necessarily evoke the sinister, big-brother imaginaries of a more overt security system (Peterson, 2015). The sense that there is a human (or non-human) monitoring you can be experienced as a form of careful (care-full) surveillance, where being monitored by another is a source of freedom rather than oppressive (Richardson et al., 2017). However, digitally mediated care practices can be experienced as intrusive (Berridge, 2017), unwanted (Madianou, 2016), or as a sense of 'too much' closeness (Pols, 2013). Which surveillant practices are experienced as careful and which are not is cultural (Hjorth et al., 2020) and contingent.

2.4.5 Digital intimacies and ambient co-presence

The ability to maintain social relationships across time and space is a particularly important component of digitally mediated care. Digital technologies in many ways make maintaining communication with family and friends easier. Internet based technologies for communication can be cheaper than previous forms of networked communications such as the telephone and quicker than analogue forms of communication such as letter writing. It has been argued that regular ICT-enabled contact is crucial in supporting older people to have meaningful social ties with family and friends (Rønning & Sølvberg, 2017) as well as broader communities (Garvey & Miller, 2021). This became particularly important during the COVID-19 pandemic, when the opportunity for proximal social interaction was limited (Watson et al., 2021).

However, these new affordances come with new power dynamics. Licoppe (2004) and Ito and Okabe (2005) noted that with the emergence of the mobile phone, people became considerably more available to others. This has led to a new social expectation that people would always be contactable. This situation creates an "ongoing background awareness of others" (Ito & Okabe, 2005, p. 13). For Ito and Okabe (2005) this constitutes an 'ambient virtual co-presence'. The periodic exchange of text messages and the ability to call leaves the possibility for contact always open. Contemporary digital technologies, such as social media, enable older people and their social supports to constantly check on in each other, with regular messages, voice, and video calls (López-Gómez et al., 2021). Madianou (2016) developed the term 'ambient co-presence' to encapsulate the increased awareness of other people in the background fostered in rich media environments.

Ambient co-presence can be reassuring for older people and can contribute to their health and well-being (Singh, 2015). Establishing ambient virtual co-presence is a practice explicitly linked with care (Beneito-Montagut & Begueria, 2021). Hjorth and Lupton (2020) demonstrate that networked, digital devices enable casual, regular communication and from this a sense of deep intimacy emerges that is imperative for the well-being of older people and those in their networks. This care is fundamentally intergenerational and multi-directional where people move "across different positions (sender/receiver, giver/taker)" (Beneito-Montagut & Begueria, 2021, p. 128). Checking in as a form of care is regular, quick, and above all, non-invasive (Beneito-Montagut & Begueria, 2021). Creating a routine, shared presence is a crucial part of generating an affective sense of 'care at a distance' (Pols, 2012). This care at a distance

temporality can include routine for when calls take places (often to accommodate different time zones) (Cabalquinto, 2018a) or calling, messaging, or taking images at significant times in the day (such as mealtimes) (Hjorth et al., 2020).

Ambient co-presence includes the mutual offering of emotional and moral support (Sinanan & Hjorth, 2018). Hjorth et al. (2020) demonstrate that a particularly important component is playfulness, typified, for example, by the regular exchange of digital gifts such as photos or links to things others might enjoy. Uplifting images and memes, for example, are part of cultivating a sense of support and warmth at a distance (López Gómez, 2021). The sharing of digital pictures generally has been found to generate a sense of closeness despite geographic distance (Quan Haase et al., 2018). This is particularly salient for transnational families (Hjorth et al., 2020).

Ambient co-presence can be realised unequally between people in the care relationship. Such unevenness can be related to differential capacity for technical connectivity and to meet costs (such as of internet calling) (Cabalquinto, 2018b). More conceptually, the level of intimacy itself can be uneven and paradoxical – sustaining connections for care is not without pressure, compromise, and sacrifice (Watson et al., 2021). Social connectedness and positive impacts on well-being are not a pre-determined outcome of ambient co-presence. In many cases supportive, close relationships are a pre-requisite for this kind of connection to occur (Pols, 2013). Older people, some literature suggests, have a high need for contact, which adult children can experience as too time consuming (Beneito-Montagut & Begueria, 2021) and in some cases, even controlling (Nedelcu & Wyss, 2016).

This section has highlighted the complex, multiple experiences of age and care that technology constitutes. Dataveillance, the datafication of health and care, connected homes and ambient virtual co-presence speak to affectively different experiences of age and care. The processes of ageing and caring constituted by technology produces binary understandings of age that can be easily linked with the imaginaries of the third age (self-caring older person) and fourth age (cared-for older person). The practices of datafication and dataveillance detailed here categorise older people across binaries of frail/fit, dependent/independent, or risk-averse/risk-prone (Dalmer et al., 2022). A notable takeaway at this junction is that inequalities related to

gender, class, race, sexuality, and ability remain salient issues related to how digitally mediated care functions.

2.5 Age and care constituting technology

Technology constitutes the experiences of ageing and care in uneven ways. Age and care, in turn, are also significant drivers that shape technology. In practice, what a technology means is also shaped by older people who can, in some contexts, use technologies in creative ways that go beyond the emphasis on neoliberal conceptions of individualised responsibility and active ageing. The 'effects' of a technology are never entirely given (Ertner, 2022). How gerontechnologies, health technologies, and everyday technologies are used by older people in practice often differ wildly from scripted or intended uses. Rather than simply being passively impacted by technology in situ, older people and their caregivers actively use, modify, and reject technologies hence influencing what that technology means and its possibilities for use (Fernández-Ardèvol et al., 2019; Neven, 2015).

For example, Bergschöld et al. (2020) interviewed care professionals working in gerontechnology showrooms. These showrooms were funded by the Norwegian government to overview the kinds of technologies that enable ageing at home. The authors found with the help of the care professionals, showroom visitors often adopted a 'DIY' approach. Ready-made gerontechnologies were often at odds with visitors (or those they cared for) lifestyles and so innovative alternate solutions were often found. These included using commonly available items, such as LED lights available from IKEA. In another example, López-Gómez (2019) drew on ANT to study the implementation of a telecare system. He found that users had had many methods of keeping safe that they used prior to the implementation of the telecare alarm system. These methods were designed to let other people know they were well through measures such as making a phone call or lifting the blinds at a particular time. Had this not occurred, the other person would have known to check on them. In each of the cases, technologies became care technologies in interaction with older people and their carers – age and care have shaped technology.

There are a plurality of reasons and ways in which older people use and value (and do not use and do not value) digital technologies for care (Gallistl & Wanka, 2022). Older people value

and impute technologies with meanings that are more complex than the binary user categories that are encoded into gerontechnologies as well as into policy and marketing visions for how other commercially available technologies can be used. Berridge (2017) interviewed residents, staff, and family in independent living apartment complexes in the USA about experiences with a monitoring alarm system. The system worked by placing sensors in five places around the apartment with an algorithmic alert system that triggered when sensor data indicated a fall or other adverse event may have occurred. The system rendered users passive. However, some of these users subverted and misused the system. One participant had a fall but scooted across the floor to call for help, avoiding triggering the alert and instigating a response (which would necessitate a trip to the hospital). Others used the technology as a means for social connections. In each instance, older people as users changed what the technology meant in practice. They actively shaped how their digitally mediated care functioned.

2.6 Digital care beyond devices and users

Taking a radically different approach, numerous sub-disciplines within media and cultural studies and STS study, albeit from different perspectives, the ways that media devices are not discrete and bounded entities but part of broader material processes. These perspectives are particularly useful for understanding age as constitutive of technology. Further, they offer a means to situate digitally mediated care in a much broader context.

Before elaborating this argument, I will first give a very brief overview of relevant research. In media ecologies, technologies are understood as part of a multi-scalar, multi-temporal system comprised of technologies, subjects, materials, socio-economic forces, and so on (Scolari, 2012). This approach conceives of technology as relational, and studies how human and nonhuman actors connect, interact, and transfer between each other (Taffel, 2013). The media archaeology approach, developed by Parikka, theorises media through connecting the inside of devices to the geophysical context that they are developed from and return to as waste (Parikka, 2013; Parikka, 2015). The approach focuses on the material conditions of media, and sees media cultures not as ‘linear’ but as processual, sedimented ‘folds’ of time and materiality (Parikka, 2013).

The figure of the cyborg has been an incredibly significant influence in media and cultural studies as well as STS. The cyborg points to the ontological dissolution of the boundaries between nature and culture, technology and user (Haraway, 1991). The cyborg, in the context of digitally mediated care, points to the collapse between the older person and technology (Joyce & Mamo, 2006). When assistive technologies, gerontechnologies, and other technologies such as smart watches become part of care and self-care routines the boundaries between device and person are collapsed. The relevant insight offered by these approaches is that technology is not a discrete and bounded entity that exists fully formed. While a full consideration of the breadth of these approaches is beyond the scope of this thesis, it is significant that there is a shared emphasis on displacing the device and the user as the sole sites for analysis. These approaches point to the necessity of a consideration of the broader material, political, social, and technological relationships that constitute technology.

Understanding media technologies in terms of material processes disrupts the idea that such technologies are 'new' and places them in deep time. The materiality of a media device begins long before it becomes media (Parikka, 2015). As just one example, aluminium is used in many devices, alloyed with other materials to form parts of the body. Aluminium is mined from bauxite, which forms over a period spanning between a few hundred thousand and several million years (Ingulstad et al., 2013). Digital devices are produced under deleterious conditions which involve significant harm to the labourers that mine minerals, assemble technologies, and undertake disposal work on technologies (Parikka, 2015; Taffel, 2013). These workers suffer adverse health effects and low wages. A lack of care for these bodies (and their experiences of ageing) makes digital technologies possible.

There are two distinctive ageing process that constitute technology. Firstly, the devices used for digitally mediated care become obsolete incredibly quickly – that is, they become old fast. Secondly, the materials that comprise the device itself are durable (Gabrys, 2011). The chemical bonds between elements can take many years to dissipate if not forcibly removed. Electronic waste (as well as production waste) will pollute and cause harm long after the device has stopped functioning as a piece of media (Gabrys, 2011; Taffel, 2023). Digitally mediated care for older people in Aotearoa New Zealand is made possible, and functions as it does, because of the multiple temporal processes of ageing that constitute technologies.

2.7 Care constituting age and technology

In conceptually defining care, I follow Puig de la Bellacasa's reworking of Fisher and Tronto's seminal definition of care as "everything we do to maintain, continue, and repair our world so we can live in it as well as possible", understanding it as the "concrete", day-to-day "work of maintenance" (Puig de la Bellacasa, 2017, p. 4). The 'we' here is of ontological importance. Care understood this way is relational. It encompasses the interactions between a diverse range of human and non-human actors. It can be an action and affect. Caring involves material practices and feelings at once. Care involves and arises from relationships of mutual dependence between people, technologies, materials, and places (Beneito-Montagut & Begueria, 2021). It is the labour and practices of sustaining. This approach posits that technology is not 'opposed' to care (Mol et al., 2010) but a part of care.

The reciprocal and co-constitutive nature of care means that technologies are involved in the production of care, but also require care to work. A particularly important perspective from media and cultural studies is that new technologies tend not to simply 'save' time, but instead generate new forms of work and labour (Bogost, 2013; Burston et al., 2010; Hearn, 2008). Work refers to the more general processes that are necessary to make a technology work so that it can be used in a way that will satisfy a care need (Fuchs & Sevignani, 2013). Labour, in this context, refers to 'alienated work', where older people and their caregivers do not own, control, or share in the profits of the technologies being used in care (Fuchs & Sevignani, 2013). Examples of this digital labour include using corporate social media to sustain ambient copresence. Older people's participation in digitally mediated care allows corporate social media providers to profit. Digital labour does not exist in isolation. It is fundamentally connected to practices of labour right across supply chains for digital technologies, from the workers mining for minerals or assembling devices to the comparatively privileged workers designing gerontechnologies (Fuchs, 2013).

In order to function, any technology demands the maintenance of particular conditions (Willems, 2010). Digitally mediated care interventions are positioned as being able to replace or minimise the networks and collectives that provide care (Moser & Thygesen, 2015). Yet for technology to be able to contribute to care relies on the precise alignment of human and non-human actors (López et al., 2010). Each of these components must be working (Mansvelt &

Zorn, 2012). Information work is often not considered part of the care that makes ageing in place possible (Dalmer, 2018b), yet this work is absolutely crucial for care (Dalmer, 2018a). Rather than being able to save the work and labour done by humans, high-tech interventions such as robotics have been shown to *increase* tasks for caregivers (Wright, 2019, emphasis mine). Technologies developed to attempt to meet care shortfalls have global, energy intensive production chains which introduce a range of actors in a range of locales into the networks of older people (Wright, 2019).

Material media and cultural studies literature, particularly related to critical media infrastructure studies, makes evident that technologies are constituted by practices of care that occur beyond the device. Media infrastructures are comprised of sites such as cell phone towers, data centres, satellites, and undersea cables that are necessary for information to move between older people, devices, places, and people so that digitally mediated care can occur. Parks and Starosielski (2015) explain these sociotechnical systems are characterised by dualities. They are spread across vast distances, but also concentrated in particular locations. They are automated, but also require vast amounts of labour to design, install, run and continually maintain. They transmit information instantaneously yet have a durable and long-lasting presence. They transmit signals 'ethereally' via wi-fi networks, but also have a tangible material presence in "bunker-like facilities heavily secured on earth" (Parks & Starosielski, 2015, p. 5).

Taking data centres as one 'site' within multi-scalar infrastructures, the contemporary 'hyperscale' data centre requires significant amounts of high-powered computing hardware, as well as in-built mechanisms for heating and cooling (Taffel et al., 2022). The data centre is characterised by regular faults and failures that require fixing (Neilson & Rossiter, 2021). The ways that tasks are automated and experiences of labour within data centres depends upon how workers are positioned in global flows of capital (Neilson & Rossiter, 2021). In these flows, data workers can be positioned as precarious (Mayer, 2023). It is notable that the materials, labour and the energy required for these infrastructures to run are generally derived from the global economic periphery, meaning that the negative environmental and social consequences of mining, extraction, and production congeal there (Taffel et al., 2022).

As Mattern (2018) points out, the digital simultaneously resists care (many devices are purposely designed to be hard to repair) and requires significant amounts of maintenance activities across a planetary, multi-temporal infrastructure. She points out that the distinctions between who is cared for by digital infrastructures such as data centres and those who need to care for these digital infrastructures are shaped by class, gender, and race as well as political, cultural, and economic flows (Mattern, 2018). Digitally mediated care for older people ageing in place in Aotearoa New Zealand functions as it does because of the caring activities that constitute and maintain technology.

2.8 Conclusion

This chapter has argued that age, technology, and care are co-constituted. How technology for care develops is shaped by the desire to find cost-effective solutions for the care of ageing populations. Ideas (and ageist ideas) about older people influence gerontechnologies. At the same time, how older people use technology influences what technologies mean. This chapter has charted the ways that technologies shape age and care in ways that emphasise the quantification and surveillance of older bodies, the prediction and elicitation of healthy forms of ageing, as well as the individualisation of responsibility.

Digitally mediated care is best understood as *emergent*: a phenomenon produced in relationships between social, technological, material, spatial and temporal actors. What digitally mediated care means for older people and how it produces particular experiences of ageing (and, as will be developed through the research, citizenship) is situated and contingent. To gain insight into how digitally mediated care functions for older people in Aotearoa New Zealand communities, a flexible theoretical and methodological approach was needed. The approach needed to be able to make sense of shifting relationships between human and nonhuman actors, as well as be capable of charting how digitally mediated care opens up and forecloses possibilities for older people. Sociogerontechnology, as a nascent interdisciplinary field of literature, does not have prescribed theoretical or methodological approaches.

As the next chapter describes, the primary theoretical and methodological framework used in this research was ANT. ANT has been productively used by a number of scholars to explore how digitally mediated care functions. As has been described here, ANT was employed to

study how smart phones functioned for people with disabilities in China (Lin & Yang, 2021). Mort et al. (2009) have used ANT to chart how patients and citizens were marginalised in the early development of telehealth. Gilleard and Higgs (2021) utilised Latourian concepts to explore the disjuncture between the promises of technological developments to expand the capacities of older people and the disempowering reality of many digitally mediated care interventions. In each of these different approaches, ANT enables scholars to trace relations between human and non-human entities to create particular subject positions for digitally mediated care recipients.

Locating this research at the intersection between sociogerontechnology, STS, and media studies is fruitful for exploring how age and care constitute technology – an aspect of digitally mediated care that is currently under-theorised in the burgeoning field of sociogerontechnology. ANT is well suited to the task of understanding how age and care shape technology. Similarly, the concept of digital labour as introduced here is productive for making connections between older people's everyday experiences of care in corporate digital environments and other forms of labour in the supply chains of digital devices. As I detail in the next chapter, employing concepts like digital labour from the political economy approach to media (and ageing) offers an additional perspective on the power dynamics of digitally mediated care.

3. Theorising sociotechnical care networks

This chapter describes the theoretical and methodological framework that guided this research. I argue here that to explore how digitally mediated care functions for community dwelling older people in Aotearoa New Zealand both techno-cultural and socio-economic elements need to be considered. A consideration of techno-cultural elements involves exploring technologies, users, and content. A consideration of the socio-economic elements of digitally mediated care involves thinking about ownership and business models as well as government strategies (van Dijck, 2013). In order to undertake this task, I followed van Dijck (2013) to employ an unorthodox combination of approaches: Actor-network theory (hereafter, ANT) and Political Economy (hereafter, PE). The ANT approach was used to trace the relationships between people, technologies, materials, spaces, and times that enable and constrain care. It allowed me to see how digitally mediated care functioned in everyday life. The PE approach enabled me to better understand the corporate and state actors that shape how the sociotechnical care networks of many older people function.

3.1 An introduction to ANT

Developed by Bruno Latour, John Law and Michael Callon, ANT is a relational ontology and the primary theoretical and methodological framework of this research. While ANT has theory in the name, there is some contention as to whether it is actually a theory. ANT is less concerned with attempting to explain 'why', but instead attempts to describe how things relate and assemble together (or not) (Law, 2008). Following Law, the approach can be understood as:

> "… a disparate family of material-semiotic tools, sensibilities and methods of analysis that treat everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located. It assumes that nothing has reality or form outside the enactment of those relations." (2007, p. 2)

The approach posits that no *a priori* distinctions between entities exist. There is no innate difference between social/material, subject/object, technology/user, technology/society (Spöhrer, 2019). Everything gains shape and form within networks of relations. From a practical perspective, this means that ontologically each of these categories is the same and can be understood using the same repertoire (López-Gómez, 2019). In this way, ANT and sociogerontechnology are very complementary.

3.1.1 Key terms: Actor, translation, sociotechnical care network

A core concept for ANT is the notion of the actor. An actor, as understood in this thesis is "any *thing*" that makes a difference (Latour, 2005, p. 71, emphasis in original). The interactions between actors shape how age, care, and technology are constituted. Material and semiotic actors are always in interaction, continuously altering one another in relations. Intention, from the ANT perspective does not matter for action (Latour, 2005). Actors can make other actors do unexpected things (Latour, 2005). As actors interrelate, they both make possible and delimit interactions. Humans and non-humans can be actors.

There is no hierarchy of actors within ANT. Human and non-human actors are treated equally. An adult child is an actor shaping how digitally mediated care functions for an older person. They shape how an older person can act, making certain actions possible and blocking others. In the same way, a software platform such as Facebook Messenger is also an actor. It makes particular actions possible, changing how care and age are enacted. When encountering the term 'actor' through the thesis it is, as per Latour, vital to recall that an "actor is never alone in acting" (Latour, 2005, p. 46). Actors may *appear* to be stable and fixed entities, but in actuality they comprise many actors 'held' as a seemingly stand-alone actor-network. Facebook Messenger, for example, comprises a vast number of actors from the user, to the device on which it runs, to the corporation Meta. When Messenger is described as an actor, it indicates that an entire actor-network acts as one so as to appear a distinct, bounded entity. When an actor is described as an actor-network in this research, it denotes that the boundaries of the actor are unclear. It is through a process of translation that networks 'speak' as one actor.

Translation, as it is defined in this thesis, is the process in which actors are brought into coexistence and bounded as actors within care networks. It describes the ways actors relate by defining roles, ordering each other, and creating possibilities for action (Law, 2008). In the process of translation, networks are assembled and held, with the interests of some actors being foregrounded as the interest of an entire network. For example, a medical alert alarm creates a particular role for their user. These devices have very particular conditions for use set by the provider. The device must be worn on the body, in a specified place. Some companies request the pendant is not hidden under clothes (López-Gómez, 2015). There is a prescribed schedule

for where it must be worn. For example, one New Zealand provider insists the device is worn in the bathroom. The alarm can only be pressed for certain emergency events. When the older person takes up these conditions and acts in the role prescribed, a translation can be said to have occurred. In this instance, the provider has their interests foregrounded. Each human and non-human actor makes a difference to how care unfolds and the older person's experience of care. The benefit of the ANT approach is that it enables me to describe how humans and non-humans are linked together through translation, and the kinds of digitally mediated care practices that can be accomplished based on these associations (Lin & Yang, 2021). Most importantly, using ANT to study translations is useful for analysis of how care functions for older people because it enables close attention to the interactions between actors. What possibilities arise? What possibilities are foreclosed? Whose interests direct these interactions?

This research will look at sociotechnical care networks: how they form, how roles are created by different actors, and the work that is needed to keep them in place. This term 'sociotechnical care network' used throughout refers to a description of many sets of relations and translations in which care is produced for older people or which attempt to produce care for older people. To speak of a sociotechnical care network is to refer to the energy and movement between actors constantly making each other do things (Latour, 2005). There is no one socio technical care network. Each participant is involved in multiple, heterogenous networks. Because care, technology, and the older person all take shape in these interactions, there is not one version of digitally mediated care (Pols, 2017).

How digitally mediated care functions for older people and whether care can be achieved depends on the interactions between social and material actors in these networks. There is no one version of good care, but a variety of 'goods' emerge in these situated interactions (Willems, 2010). Technologies come inscribed with norms about users, lives, homes, and care practices (Willems, 2010). In this way, they contain a version of good care and transform older people to fit these norms. Yet as older people with particular circumstances tinker (Mol et al., 2010) with technologies so that they meet their needs, new versions of good emerge. For example, a Fitbit comes inscribed with particular ideas about good health (linked, for example, to movement, exercise, and physicality). As an older person uses the device to meet their own ends (making use of the device's heartrate monitor, for example) a novel version of good digitally mediated care arises.

ANT offers a robust way to think about the technologies in digitally mediated care. Insofar as technologies can be said to have effects on care, this is only because of the interactions of a network of humans and non-humans (Latour, 1999). Technology does not 'act on' humans (Cresswell et al., 2010, p. 2). Older people are not passive recipients of digitally mediated care. Nor does technology act as a straightforward, subservient means to an end (Latour, 2002; Mol, 2008). Technologies are not a passive instrument that achieves care goals. A digitally mediated care intervention will modify, inflect, and even displace the original intent (Latour, 2002), introducing unforeseen consequences for care. Taking an ANT approach to technology means that it must be considered in terms of its social, material, political, and economic contexts (how and why was it made?), its material and semiotic nature (how and why does it work as it does?), as well as in terms of the effects that it has (what does it do for care?) (Latour, 2002). In practice, these associations are endless. The following chapter details how decisions were made about how to bound this research. The substantiative point to be made at this juncture is that care is transformed by the digital mediation. Mediation, in Latourian terms, changes the meaning of the original intent just as the process of mediation, as employed in media studies, does not faithfully represent the world.

3.1.2 Key terms: Agency

ANT is part of a broader new materialist body of work that radically reconceives of how agency is understood. Traditionally, agency in western intellectual traditions was theorised as a human property. Kant, for instance, famously proposed that humans have the capacity to choose to act, rather than acting because of deterministic laws of nature or culture (where religious, medical or other expertise determines the actions individuals take) (Guyer, 1992; Schillmeier, 2012). Agency is linked with this capacity for rational and intentional action that sets humans apart (Munro, 2009). In this way, the human is (at least potentially) a free and moral being. In contrast, in ANT, the premise that action arises *solely* from human capacity is refuted (Latour, 2005). ANT rejects that there are 'natural' laws and 'social' laws.

Latour (2005) suggests a distinction between the material and the social world does not exist – there are not sets of relations that are stable and consistent enough to be deemed 'the social'. To the extent that 'society' exists, it exists only as a relational effect: a product of relations

between heterogenous human and non-human elements that have been held together through a series of translations. Agency, the capacity for action, arises from relations between social and material networks (Moberg, 2018). If an action appears to derive from the social or the material, it is because large parts of this web that enables action are hidden (Law, 2007). A focus only on 'the social' for explanations obscures the material actor-networks that make what might appear as 'the social' possible. This invisibility can be perpetuated by research that focusses only on human perspectives and explanations of the world. Employing an ANT approach to agency in this research involves tracing how humans and non-humans relate to one another and in relations, produce particular experiences of age and digitally mediated care.

There are ethical and political implications of the reconceptualization of agency. Older people (particularly those in the fourth age) are framed in mainstream research about ageing, the media, and everyday life as lacking agency. Ageing bodies and minds are depicted in ways that suggest they are 'losing their faculties' for rational and intentional action (Gilleard & Higgs, 2011). In these kinds of representations, older people are depicted as increasingly shaped by social or natural laws and not as full, rational humans with agency. Understood this way, technology is positioned as acting upon older people. The approach to agency taken by ANT (and sociogerontechnology) offers a particular challenge to this way of understanding age. ANT posits that older people act within networks of humans and non-humans. Their agency only arises from these interactions. It does not precede them (Wanka & Gallistl, 2021). The more distributed approach to agency disrupts the idea that older people are passive and acted upon by technologies (Joyce & Mamo, 2006; Peine et al., 2015).

Importantly, this is not the same as re-locating agency with ageing subjects. As Moreira (2017) argues, discursive attempts to relocate agency with the ageing subject become problematic in the context of political imperatives for older people to be active and engaged. A focus on the older person's capacity for action and rationality compels particular behaviours on the part of the older person (Katz, 2000). Restoring agency constructs an older citizen that can take responsibility for their own care, displacing the responsibility that other actors (such as the state) might have to support the material well-being of older people. A distributed approach to agency forces the relationship between age and political subjectivity to be reconceived.

There are further notable benefits to de-linking agency from the subject. Firstly, limiting what is presumed in advance means that the unexpected ways that older people and technology interact to open up possibilities for values linked to agency (such as autonomy) become evident. Secondly, conceptualising agency as distributed means that more of the non-human actors involved in producing the experience of agency are made visible. For example, an older person with limited mobility may use a website to order groceries online and have them delivered. This informal self-care practice may circumvent the need for other care interventions (such as having someone assist with grocery shopping). In this example, an actor network involving the supermarket, the supermarket website, web-browsers, servers, and many actors make 'doing the shopping' and making choices about what to purchase possible, producing an experience of independence for the older person.

Such an experience is made only possible by human and non-human actors, which have differential experiences based on their position in the care network. The supermarket workers who pack the groceries are likely to be on very low wages. Three quarters of supermarket workers report not earning enough to cover their living expenses (Edmunds, 2024). This significantly impacts the ability of these workers to exercise autonomy (as well as the experiences they will have of ageing). Thinking about the actors involved in producing agency for the older person as distributed can make the unevenness of digital care visible. Attending to what is made possible and for whom is a vital task for thinking with care.

3.1.3 Key terms: Power

ANT treats power in a distinct way, that has both benefits and challenges for this research. ANT favours descriptive accounts of relationships between actors. When studying power, the focus of ANT is predominantly about how action is directed within these interactions (Munro, 2009). Some actors wield comparatively more influence, insofar as they have the ability to direct other actors (human and non-human) into particular network positions (Michael, 2017). ANT scholars reject that there are deterministic, overarching structures of power. This is not to say that significant, persistent inequalities do not exist. For example, it is obviously true that women, older people, and racialised populations shoulder an unequal burden of responsibility to care. Latour's argument is that to understand such inequalities, 'jumping to structure' as an explanation for why these inequalities persist is unhelpful (Latour, 2005). The task of the

researcher, ANT posits, is to trace all of the interactions that make up the inequality in a particular location. No attempts to abstract from the 'local' can be made without meticulously traversing along material-semiotic connections.

ANT conceives of power as relational, rather than as something that can be possessed or 'sourced', per se (Munro, 2009, p. 128). The ANT approach rejects affording some actors in a care relationship automatic power. This is useful, as a focus on structures can be reductionist (Law & Singleton, 2013), and can prevent identifying non-human, technological agencies. Power is something that is an effect of the arrangement of networks (Latour, 2005). By definition, actor-networks are situated, emerging, and unstable. The strength of ANT as a methodology is that it can be used to make visible the actors included within care networks right now (Puig de la Bellacasa, 2017). It enables consideration of which actors have their interests foregrounded, the actors which speak for networks, and the implications of this for older people.

3.1.4 Critiques of ANT

ANT has been accused of writing from the perspective of those who are the 'victors' (Teurlings, 2017). The ways that particular arrangements might have been otherwise can be concealed in this way (Star, 1991). Describing care practices as they are in the moment can mean that the practices *not chosen* can be invisible. There is a risk in that in the process of writing descriptive accounts of the interactions the researcher observes between actors, the researcher may end up blind to important actors and dynamics (Teurlings, 2017). Unmet care needs may not be represented in descriptions of interactions between people and technologies. Actors who have been translated can be obscured in ANT analysis. On one hand, "the map is not the territory" (Latour, 2005, p. 133). Even the richest, most detailed account of interactions could never faithfully represent all actors and all interactions. In describing messy knots of actors translating one another, some actors will inevitably be obscured. Yet, these translations can be violent. When some actors become 'delegates' of others, how those actors can act is conscribed (López-Gómez, 2019). Foreclosed possibilities may not be evident.

As López-Gómez (2019) argues, the focus on describing interactions is less well suited to the affective consequences of translations. Using the example of the introduction of a telecare

alarm system for people at risk of falls or averse medical events, he remarks upon the sense of loss participants felt for the previous systems they had used to meet the care need the system served. Treating social, material, and technical actors the same was analytically useful insofar as it enabled him to trace the ways that telecare alarm system became embedded in older participants lives and the struggles related to how it would be used. However, ANTs descriptive register was less suited to conveying the emotional consequences and felt intensity of these translations for the older people. In this way, the violence – the consequences of *being translated,* can be elided by ANT. This is where approaching the research with an ethical and political attempt to care is useful. It reflects a sensitisation to those who are marginalised in interactions between human and non-human actors.

ANT has been critiqued with questions about the extent to which it is able to offer nuanced and incisive descriptions of enduring and consequential power relations. The ANT approach means that rich data can be generated about how digitally mediated care functions for individual older people, resulting in accounts of struggles over how decisions about technologies and care practices are made in care dyads, as well as self-care practices and routines. Couldry argues that the perspective focuses on how networks become established and thus is blind to the "*long-term* consequences of networks for the distribution of social power" (Couldry, 2008, p. 101, emphasis mine). This critique reflects a particular tendency in ANT more than an ontological deficit. For Latour (2005), what matters is tracing actual associations between actors as they occur. If direct links across time and space cannot be made by the researcher, then a description is not detailed enough. The vocabulary of ANT, such as translation (introduced above), can be used to explain how networks hold (Teurlings, 2013).

In ANT, explaining how digitally mediated care works is of primary importance. This does impact its ability to describe network dynamics that recur and endure. Exploring *why* some forms of care for older people (digitally mediated care) and why some particular caring practices (such as those concerned with quantification) are supported and sustained by institutional and infrastructural actors is less important for ANT (Couldry, 2020). In practice, ANT research does often focus upon users and technologies while paying less attention to media content as well as organisational and institutional entities (van Dijck, 2013). This is potentially a significant issue for this research because, as the introductory chapters have made clear, organisational and institutional actors are involved in shaping how care functions. In this

research, ANT is supplemented with political economy theory (PE) to analyse corporate and state actors.

3.2 An introduction to political economy

Two different applications of PE theory inform this research. Given that this research focuses upon digitally mediated care from the perspective of older people, these are the 'political economy of age' and the 'political economy of media' (encompassing digital technologies used for care such as smart phones and social media). PE theory, very generally, is the:

> "study of the social relations, particularly power relations, that mutually constitute the production, distribution and consumption of resources…" (Mosco, 2009, p. 24).

PE approaches to ageing start from the premise that in capitalist societies, access to resources is highly unequal (Estes, 1990). These differential experiences of access to capital through the life course, from social class at birth to employment trajectories, are powerful drivers that influence how people experience age (Walker, 1981). The PE approach to age foregrounds the links between economic structures, social policy, and cultural aversions to 'dependency'. The PE approach as drawn upon in media studies theorises media and technologies as inherently part of wider economic, social, and political contexts (Rudd, 2013). It focuses on the relationships between how media and technology are owned, governed, and regulated and the ways that media and technology function (Hardy, 2014).

3.2.1 The political economy of digitally mediated care for older people

Most significantly for this research, these two PE perspectives direct attention to the way that the profit motive and capitalist labour dynamics shape how digitally mediated care functions for older people. The PE of ageing highlights the way that economic structures impact how care functions for older people. Since the late 1970s in 'developed' states such as Aotearoa New Zealand, concerns about the economic impact of public spending on social services such as care of older people have justified significant reductions (Gilleard & Higgs, 2000). These changes mean that responsibility for the care of the older person is individualised. Since the late 1980s, pension funds have been a significant contributor to the broader economy (Blackburn, 1999). The quality of care an older person receives is increasingly determined by

their ability to participate (directly, or indirectly through pension funds) in markets. At the same time, the commodification of 'ageing' is a significant economic actor.

The PE approach to ageing critiques the marketisation and bio-medicalisation of ageing. A productive concept developed for this critique is the 'ageing enterprise' (Estes, 1979). Particular policy approaches and scientific development interact in ways that commodify older people's bodies, lives, and the processes of ageing more broadly. Age in the west is often understood primarily in terms of individual processes of disease and in medicalised language (Estes & Binney, 1989). One consequence of the bio-medicalisation of ageing through the 20th century is that it has led to the development of an economically and socially influential set of medical and anti-ageing industries (Estes & Mahakian, 2001; Starr, 1982). Social policy responses to ageing that stress the primacy of individuals have led to the development of large, profitable enterprises that (often using public funds) offer goods and services connected to the social care of older people (Estes, 1979, 1993).

The PE approach to the theorising digitally mediated care directly links dominant ideas and practices of care to economic formations. Many of the digital applications and platforms that support care of the older person in the home are designed, funded, and constructed by large and powerful corporate actors such as Meta and Alphabet (Dolezal, 2016; Sparrow, 2016). Platform in this context refers to a digital infrastructure that enables two or more groups to connect (Srnicek, 2017). The providers of platforms position themselves as mediators. This position enables the provider to profit from the connection (for example, through the collection of data). Most are designed to be used and sold through Apple and Google's 'app' eco-systems. The platforms used for digitally mediated care interactions, such as using Facebook Messenger to check in with a family member, have been designed to maximise economic gains for their owners (Bucher, 2021). As such, the beliefs, values, desires, logics and assumptions of these large companies that operate according to logics of profit maximisation shape digitally mediated care.

Corporate social media sites and other applications are often free or low cost to use, but the digital care practices outlined here all generate value for these large companies (Fuchs, 2015). This value is twofold. First, the web adheres to the principle of the 'scale-free network' – it is dominated by a large number of users (nodes) which connect to a much smaller number of

hubs (Barabási, 2010). Corporate social media platforms (like Facebook) and other large websites (like Google) or eco-systems (like the App Store) occupy a position as a hub, with connections to many nodes. This is a favourable network position. New nodes link to connected nodes (Barabási, 2010). As older people 'sign up' for digitally mediated care they connect to these sites. Second, user activity generates extensive amounts of data that companies like Meta can use to match advertisers and users, generating profit (Fuchs, 2014).

Engaging in digitally mediated care practices can be understood as 'free labour', a particular form of digital labour. Free labour is "simultaneously voluntarily given and unwaged, enjoyed and exploited" (Terranova, 2000, p. 33). Digital care practices can be enjoyable and deeply meaningful for older people. In many instances, these kinds of practices are engaged in freely, without compulsion. They contribute positively to the older person's well-being. At the same time, these activities are a form of labour. Older people do not own the platforms they use, nor do they profit economically. Ultimate power over the account is retained by the corporate social media platform. This power is retained even after death (Karppi, 2018). Digital technologies that are used in care, such as social media, will demand from their users new forms of labour on the self (Burston et al., 2010). Users of such applications and platforms are directed through technological design and norms of use to conduct themselves and express their identity in particular ways. For example, such sites encourage frequent engagement (Bucher, 2018). In this way, participation can act as a form of market discipline (Hearn, 2010). These power dynamics link the caring relationship to much larger social, cultural, economic and political flows (Terranova, 2000).

3.3 The tensions between ANT and PE

ANT and PE offer very different, seemingly diametrical, ways to understand digitally mediated care. ANT concentrates on emerging networks of people and technologies that produce and destabilise care for older people. ANT fundamentally rejects the notion of structure. In sharp contrast, the PE perspective takes social, economic and political structures as the main starting point for research. It focuses on how these structures create the conditions in which particular digital care arrangements and experiences are open to older people. The PE approach foregrounds issues of ownership, regulations and institutions (Teurlings, 2013). Power and agency are often located with institutional actors (van Dijck, 2013). Latour, on the other hand,

famously rejects the notion of capitalism as an unhelpful totality (Latour, 2014). ANT considers power an effect composed of relations, and not something that resides with powerful actors (Teurlings, 2013).

While the two approaches are not entirely ontologically reconcilable, they can be productively employed to complement one another. ANT does not deny the existence of densely connected networks that mediate many other actor-networks (Callon & Latour, 1981). The institutional actors, such as states, and organisational actors, such as technology corporations, that PE focuses upon can be understood as densely connected actor-networks. ANT and PE can provide the theoretical and analytical tools for looking at different positions within sociotechnical care networks. van Dijck (2013) employs these seemingly disharmonious 'bedfellows' in this way to interrogate social media in *The Culture of Connectivity: A Critical History of Social Media.* van Dijck draws upon Latour's ANT to pay close attention to users and technologies. She draws upon Castell's political economy of networks theory to account for the institutional relations of power that shape how social media functions.

While van Dijck (2013) is studying a different phenomenon, this research is inspired by her model for combining ANT and PE. van Dick studies social media by taking social media apart in their techno-cultural and socio-economic components. Techno-cultural elements denote technologies, users, and content. Socio-economic components take into account technology ownership, governance, and business models. She then undertakes the task of reassembling the ecosystem of different social media platforms in order to understand the mechanisms and norms that shape how sociality online is constructed. For van Dijck, social media must be understood in terms of multiple, densely connected, established and emerging actor-networks. Contemporary forms of community, she argues, are not a product simply of human collectiveness but also of technical connectivity. To encapsulate this dynamic, she employs the term 'culture of connectivity'.

Ultimately, van Dijck positions platform technologies and society as co-constitutive. In this way, the model is harmonious with approaching care, age, and technology as co-constitutive. In this research, techno-cultural elements of sociotechnical care networks studied were technologies used for care, older people's experiences as users, as well as the content of digitally mediated care technologies. Socio-economic components considered were

technology ownership, government policy and strategy related to ageing and technology, as well as technology business models. These different aspects were ultimately linked together to explore the particular form of political subjectivity that digitally mediated care constructs. In this process of reassembling, van Dijck's culture of connectivity as well as the notion of the network were important concepts.

3.4 Networks and digitally mediated care

The figure of the network is central to both ANT and PE, but each theory employs the term differently. Latour famously has described the network as a concept, a tool to describe phenomena, rather than "a thing out there" (Latour, 2005, p. 131). The term was employed to contrast to totalising terms like society that do not account for non-human actors. Network describes translations between human and non-human actors. ANT has been used to study technical networks (such as telephone networks) but has also been used as a concept to understand phenomena that are not technically networks (such as drug use). In digitally mediated care, network in the ANT sense encapsulates the technical actors (networked computing) but also material actors (such as homes) and human actors (such as ways of using devices). In this research, the notion of the network has been approached primarily using the Latourian conception. As is detailed in the next chapter, mapping sociotechnical networks is one of the main methods. However, the critiques of the political and economic implications of networks offered by PE provide a lens with which to evaluate the network descriptions and to better understand the forms of political subjectivity that these materially heterogenous networks enact.

The PE approach to media and technologies treats networked computing as the contemporary economic base of 'developed' nations. From this economic base, networks constitute the "social morphology", with the logic of the network diffusing into all aspects of experience, power and culture (Castells, 2010, p. 500). The ability to generate and exchange large amounts of information is heralded as playing a contributory role in reorganising Fordist capital (with rigid managerial, organizational and factory-like production chains) into a model of flexible accumulation, where capitalism is characterized by varied organizational structures and global supply chains (Harvey, 1990). In 'developed' economies, these shifts saw a rise in occupations concerned with information and culture (Lazzarato, 2006). Services such as care became

increasingly commodified. Understood this way, networked, digital technologies and neoliberal policies have changed how care, economies, and ageing are organised and experienced.

In the 'network society' proffered by political economists and other network theorists, social relationships and self-hood have qualitatively changed. Castells (2011) argues that a consequence of the network becoming the material base of society, influencing social formations, is that there has been a dissolution of the shared identity. Studying the networked social formations digital technologies engender, Rainie and Wellman (2012) argue that rather than small groups of closely linked communities centred around geography and consistent institutions like workplaces and churches, people now interact with their own sparse, dynamic, loosely knit social networks. The individual, rather than the family or household, becomes the primary unit of social and technical connectivity (Wellman, 2001). Drawing upon Castells and Wellman, Papacharissi (2018) contextualises the 'networked self' as connective and collaborative (always linking to other people), and 'liquid' enough to be coherently performed across many different online contexts for different audiences. These discussions of networked selves provide a useful way for thinking about how digitally mediated care practices in materially heterogenous networks enact particular experiences of citizenship.

3.5 Conclusion

Following a path charted by van Dijck (2013), this research has admittedly taken an unconventional approach to data collection and analysis in combining ANT and PE. The ANT approach directed me to consider users and technologies together, along with spaces, temporalities, and materials in order to understand how digitally mediated care functions within older people's lives. From this perspective, care was presumed at the outset to be fundamentally relational, produced through interactions in sociotechnical networks. This enabled me to see how different arrangements of actors worked to enable care for older people, but also how particular network arrangements constrained the achievement of care (López-Gómez, 2015). The PE approach offers the tools to better understand institutional actors as densely connected nodes which many sociotechnical care networks connect to. The conceptual vocabulary of PE approaches, such as digital labour and the ageing enterprise, is useful for analysing the ANT data to better understand how digitally mediated care functions. Taken

together, the approach has enabled me to explore both the techno-cultural elements of digitally mediated care (encompassing technologies, users, and content) and the socioeconomic elements of digitally mediated care (encompassing ownership, government policy and strategy, and business models) (van Dijck, 2013).

4. Studying sociotechnical care networks

The goal of this research was to find out how digitally mediated care functions for community dwelling older people. This was explored by identifying how care networks are built and maintained (Callon, 1986), how roles are created by and for actors (Law & Callon, 1988), and whose interests direct these processes. While the research is theoretically informed by a combination of Actor Network Theory (ANT) and Political Economy (PE), the approach to research design (comprising choices related to how to collect and analyse data) was informed primarily by ANT. This thesis has not drawn upon methods commonly used in PE such as historical research or economic, statistical and market analysis (Hardy, 2014).

As a way of designing research, ANT can be considered a 'loose sensibility' that orients the researcher (Law, 2004; Nimmo, 2011). ANT stresses the importance of approaching research design in terms of symmetry, where a hierarchy between human and non-human actors cannot be presumed in advance. How and why digital care functions, that is, depends on human and non-human agencies (Latour, 2005; Nimmo, 2011). The purpose of ANT is to untangle these agencies through empirical research. Concepts from PE were drawn upon to better understand particular actors within sociotechnical care networks, notably business models (van Dijck, 2013), as well as to interpret the results of the ANT analysis.

There are three sections to this chapter which describe the particular approach that was taken to empirically study sociotechnical care networks. The first section describes the research design, explaining why a particular network of methods was chosen and introducing how sources of data were chosen. Data came from interviews with 16 community dwelling older people, marketing materials of technologies used by those interviewed, the interface of an exchange platform and of a patient portal used by some of those interviewed, as well as government documents. In this first section, interface analysis is discussed as an analytic method. The second section describes how the research with human participants was conducted. Here recruitment, the COVID context, and ethics are discussed. Finally, the third section outlines the primary approach taken to analysing the data, involving network mapping and thematic analysis.

4.1 Research design: Methods for generating data

One of the most common methods employed by those studying digital care within the Science and Technology Studies tradition that informs ANT is ethnography (a canonical example being Pols, 2012). Ethnography involves interviews as part of broader, sustained periods of observation of interactions between actors in a network[2]. Ethnography, often combined with document analysis, gives the ANT researcher access to the messy interactions between human and non-human actors. Undertaking an ethnography-style study, where people were observed in different settings over an extended period, was discounted for this research. In large part, this reflects that COVID had a dual impact on the research in 2021. COVID made spending extended periods of time with people in community settings more complex. Further, COVID led to a change in my own family circumstances, necessitating a switch to part-time study.

A selection of methods and modes of analysis were chosen to strike a balance between generating rich accounts of heterogenous care networks and what was practicable. This included 16 semi-structured interviews with community dwelling older people. Within ANT, interviews are rarely used as a sole or primary method because, as Demant and Ravn (2020) explain, ANT generally rejects privileging human actors, which interviews necessarily focus on. To address this, participant observation was also conducted during the interviews. These older people served as the entry point from which I traced associations between human and nonhuman actors in complex care networks. These study participants are connected to any number of densely connected, larger actor-networks including local medical centres, national policies, technologies, technology providers and so on. To learn more about the non-human actors in sociotechnical care networks, two interfaces and marketing documents associated with digital technologies used by participants were analysed. Additionally, a small selection of government documents pertaining to digitally mediated care were analysed. While not often mentioned or experienced by participants, these connections are nonetheless of salience. Government actors are densely interconnected nodes that enable and constrain many individual care networks. In that sense, the research can offer insights that speak to broad network dynamics.

[2] In media and cultural studies, ethnography (particularly digital ethnography) can look different to the ethnographical approaches employed in STS, with much shorter time spent ‘in the field’. Ultimately, I have chosen to completely distinguish from the frame of ethnography to avoid confusion

4.1.1 Interviews and observations

I made an effort to make the interviews as appropriate for the ANT approach as possible. Semi structured interview was chosen as a method of interviewing, rather than a structured or unstructured approach, because it felt the most appropriate for the ANT approach to research design. It enables clarification, elaboration, and a conversational approach to elicit answers that may not be immediately apparent when following a set schedule (May, 2011). In practice, this meant that I had a series of potential questions that could be asked while retaining a degree of flexibility in what was discussed. That the discussions took a different form with each participant also reflects that what was being offered was descriptions of networks from the participant. Each network has different dynamics and different key actors (López-Gómez, 2019).

In designing the interview schedule, I drew heavily from the book *Researching a Posthuman World: Interviews with Digital Objects* to make decisions about what kinds of things to ask (Adams & Thompson, 2016). The book discusses posthuman methodologies, including ANT. Using the approach to interviewing developed by Adams and Thompson (2016) encouraged me to ask questions about how particular technologies 'showed up', were incorporated into daily routines, required things of their user, and encouraged me to solicit stories or anecdotes about memorable moments as a way to 'see' actors relating. See Appendix A for the flexible interview schedule. In total, 16 interviews were conducted, each generating between 17 and 35 pages of data.

Observation of participants using their technologies was a further method employed to make the research ANT appropriate. Observation is an important part of the ANT method repertoire. Observation was chosen because rich insights about power relations, about the capacity of actors to affect others, can be gleaned by focusing on how human and non-human actors interact (Baiocchi et al., 2013). Participants were asked to show me how they used their technologies. Notes were taken during and/or immediately after the interviews about these interactions. I made notes during the interviews (using pen and paper) and then in my car afterwards. These notes then informed network mapping (discussed below).

In conducting observations, I was concerned with how particular actions were made possible or impeded by technologies. In this regard, some prompts I used to guide myself were: How easy was showing me something? Could participants achieve what they were setting out to (such as showing me a portal) straight away? I noted down whether a person could navigate straight to what they wanted to show me. I made a note of any barriers or problems that occurred. For example, when participant Alan was going to show me his patient portal, he first needed to get his log in link. This was in his emails. First, he went to the wrong email address. He navigated through the folders before realising he needed to log in to another email. He then found a folder 'Alan's Health' and from there could access the portal. I was also interested in noting down the distractions that came up while participants were using the technologies. For example, as Corrina was navigating through her device, each time she scrolled past her email app she would open it and look at her emails. These two different interactions say a lot about how actors relate, which tasks are natural and unnoticed, and which require more thought to achieve a goal.

A significant advantage of observation was that it enabled a better understanding of the domestic, spatial context of technology use[3]. In ANT research this material context is considered an agentic actor. Observation involves the process of documenting different materials present, while being cognisant that how boundaries are applied to actors and to observations are always, to a degree, arbitrary and artificial (MacLeod et al., 2019). With some participants, I travelled through the house to see spaces where technologies were used and the objects that surrounded them. I did not do this with all participants. I only asked where I felt participants would be comfortable with such a request. The spatial context of technology use in the house played a role in shaping whether I made these requests. Where participants mentioned they had technologies they did not often use in spare bedrooms, I did not ask to see them. Where participants had technologies they used frequently in other living areas, and I deemed it appropriate, I went to see them. I made this decision based on the participants seeming desire to protect privacy, their mobility, and an admittedly arbitrary differentiation between living and sleeping areas. Apart from in one house, which only had two living spaces (a combined kitchen/lounge and bedroom/bathroom) I did not travel into participants bedrooms. These spaces are generally considered more private. I felt to ask for access without

[3] The domestic space is, of course, just one component of technology use. A planetary spatial context is necessary for a technology to 'work'.

prior discussion might have been invasive. As such, the spatial context of the home ended up being an actor that did shape the data collected.

Further, observation aimed to study how spatiality and materiality of the home impacted and was impacted by sociotechnical care networks. I was interested in where different technologies were kept in the context of the home and the kinds of other things that were in the space. How do objects, spaces, and technologies interact? This is significant, because these interactions can produce or impede care. As an example, to illustrate, participant Daphne had a computer room just near the kitchen and lounge where she kept her PC. The room had a big window and lots of light. When we were there, we had a hot drink and Daphne also provided me with a muffin to eat. Daphne's dog came freely in and out of the room for pats throughout the interview. There was a seat already in the room that I could sit on. The room was clean and tidy and not dusty. There were little bits of paper with lists and such on the desk.

In the interview, Daphne mentioned using the space with another person sometimes, such as when planning a trip with a friend or a daughter if she needed help. She spoke about using the computer as part of her routine quite a lot. Through interviewing Daphne, I learnt that the PC was an instrumental part of her everyday self-care routine. She used it to access her patient portal, to keep track of and buy her herbal supplements, for social media, and so on. The features and affordances of the space shape Daphne's sociotechnical care network by influencing the different ways that the PC is used. For example, the room is big enough to accommodate other people when necessary. In practice, this means that Daphne can easily get help from her daughter or share a task with a friend. In a smaller room, being shown how to use something would be more difficult, impacting upon Daphne's confidence and the kinds of things she can do. Recursively, that the PC is placed there impacts how the room is used and the kind of space that it is. Ultimately, these kinds of observations about the space gave me a better sense of what care networks look like and why, and an understanding of the actors involved beyond just people and technologies.

Observation was also carried out for participants who were interviewed via Zoom[4]. While the circumstances were different with the participants who were not interviewed in person, I was still able to make some observations about how participants used their devices. In the Zoom

[4] A video calling platform common at the time of the interviews.

interviews, my observations were tethered to the room that the participation was in. This significantly influenced the kinds of network interactions that were visible to me. I was unable to observe the spatial context of the home in the same way. In these interviews I did not see participants acting with devices beyond the one being used for the call. Further, I could not view participants navigating through their devices and using their devices (although one participant had brought other devices into the space set up for video calling and used screen mode to show me a virtual reality world he had created). Nonetheless, I was able to observe some network interactions related to how easy joining the call was and the location the participant had chosen to call from.

For example, I interviewed Viola over Zoom. Viola mentioned that she had not used Zoom before. I sent her an email with instructions, and she connected with no problems. She used her iPad to join the call and mentioned she was pleased to have learnt something new. Later in the day, I got a notification that Viola had 'joined' my Zoom room, suggesting that she was consolidating what she had learnt. Viola sat in a comfortable chair and did not move through the interview. These kinds of observations were supplemented by the network descriptions in the interview data: this is her favourite device, the one she feels most comfortable on. She had a broken toe, and her mobility in the house was limited. Viola spoke about her shifting confidence over time, and how she was no longer scared to 'press things'. While the Zoom experience meant that I saw less of the actors involved in her sociotechnical care network, I could still be attuned to the many interactions between a number of different human and non-human actors that were visible. Across the participants, the volume of observation data varied between half a page of notes and 2 pages of notes.

4.1.2 Analysing digital technologies

Taking an ANT approach to studying technologies means that to understand the impact of any given technology, the researcher must consider the social, material, political, and economic aspects of its production, the material and semiotic nature of the 'technology' itself, as well as its effect on the world (Latour, 2002). Once I had a sense of the different types of technologies involved in participants sociotechnical care networks, I further followed some of these actors to learn more about these technologies. While a full analysis of ownership structures and

business models was not conducted, I first considered how a particular technology operates economically (for example, by exploring how revenue is generated by particular providers).

All technologies are designed with a particular purpose or purposes in mind, and as such are inscribed with versions of good scenarios of use (Willems, 2010). Technologies contain scripts, visions of how they should be used (Sørenssen, 2016). Those involved with the design, production, and marketing of a technology play a role in shaping the conditions that older people using internet enabled technologies act within. To learn more about these scripts, I visited the websites of each technology used by participants to access marketing and promotional material (see Appendix B). Drawing upon marketing material is one (imperfect) way that these good scenarios can be uncovered. Marketing cannot be considered a transparent window into the design of a technology. However, marketing materials are still actors that can structure sociotechnical care networks. They assemble and connect other actors (Nimmo, 2011). In this process of connecting actors, subjects, objects and their relations are constituted (Nimmo, 2011). Where companies had extensive amounts of content, site searches were conducted using terms 'age', 'older', 'senior', 'elderly', 'older person', and 'older adult'. Actors that were comparatively understudied were prioritised. For example, many participants used Facebook and there is already extensive literature on this technology that could be drawn upon, so few documents from the company were included.

A further method employed for understanding the role of technologies in shaping sociotechnical care network dynamics was interface analysis. While a forensic examination of digital technologies used in care networks was not practicable for this research, it is possible to 'reverse engineer' software through interface analysis (Gehl, 2014). Interface analysis captures how only some uses are straightforward and 'intuitive' on any given interface (Stanfill, 2015). It is an analytic method. Drawing upon Stanfill (2015), notes were made on how each interface functioned using the following questions: What is it possible to do? What is it easiest to do? What kinds of user are prioritised? With what language are users addressed on the site? How does the design of the interface reflect assumptions about the target audience? Such questions guide an analysis that attempts to understand who the ideal user is and what ideal use looks like (Stanfill, 2015). Two actors were chosen for this component of the analysis: HelpX and Manage My Health. The choice of analysis was intended to strike a balance between the kinds of interfaces that were analytically of particular significance, have been

comparatively understudied, what was feasible given the time constraints associated with doctoral research, and ensuring that participants' private information was kept private.

Manage My Health is a patient portal. I made the decision to analyse a portal because many participants used (or refused) them. In the interview data, they were evident as a significant actor that could destabilise care. While participants that used them navigated around their patient portals while I watched and made notes, conducting an interface analysis would require having recorded this process in some way (capturing images that I could use later). Sensitive health information is stored in the patient portal. While participants did give consent to me taking photographs, I felt it was inappropriate to ask to take photos containing personal information without having sought full consent for that specifically prior to coming to the house. Contacting the companies to request to speak to someone about the products (and perhaps gaining access to the interfaces this way) was unsuccessful. Two different patient portals were used by study participants. My medical centre uses one of these portals. As such, I drew upon my own personal patient portal for analysis.

Help X is a travel exchange platform used by one participant. This platform was selected for analysis as a novel platform being used in a sociotechnical care network. I signed up as a user to access the platform. Information about how the participant uses the platform has been changed slightly to protect their anonymity. Ultimately, the way an interface such as manage my health or Help X is structured is an agentic actor. It shapes how the technology is used. In this way, it is an actor that mediates care. For example, when thinking about what kind of user (host – who needs help, helper – who provides help) was prioritised on Help X, I considered the order with which listings were arranged in and the kinds of options that were available for filtering through the listings. The default display order for potential helpers is to list the most active users first. The account homepage for hosts advises that they frequently update their profile so the 'last updated' is as recent as possible. In order to get a sense of the target audience I looked at things like the order with which information was placed in the site ('find host' before 'find helper') and the kinds of people most often represented on the site. I then considered this in relation to the research question – how does this impact care?

4.1.3 Government document analysis

Government strategies inform policy and service delivery, which in turn makes particular care networks possible and other care networks impossible. The values, goals, and rationales underpinning the delivery of policies and services are also expressed in other forms of government communication (such as web pages). A small selection of publicly available Te Kāwanatanga o Aotearoa/New Zealand Government documents related to older people and digital inclusion/service delivery were included in the study for document analysis. Decisions about which documents to include were made based on actors mentioned in the interview data and actors which were not mentioned by participants but nonetheless shape the network conditions older people act within.

First, some participants mentioned that they had used different types of publicly funded digital training programmes (run out of libraries, for example). To learn more about the rationale and implementation of such initiatives, I visited the website of Te Tari Kaumātua, the Office for Seniors. Te Tari Kaumātua is the primary branch of the public service that advises the government and progresses issues and work programmes related to older people. Using the website's search function I searched for 'Technology', 'Digital Inclusion' and 'Digital Literacy'. From here, two webpages were included. The primary purpose of the webpages was to link to other government departments for additional information. Following these links, two key reports were included: *Digital Inclusion and Wellbeing in New Zealand* and the *Better Later Life* Strategy. *Digital Inclusion and Wellbeing in New Zealand* was released in 2019 by the Department of Internal Affairs which provides information related to the digitisation of public services. The report details older people as a group at risk of not being digitally included as well as the linkages between digital inclusion and well-being. The *Better Later Life* Strategy, launched in late 2019, is the government strategy that addresses an ageing population and improving life for ageing New Zealanders. The particular section chosen for analysis was "Enhancing opportunities for participation and social connection".

Secondly, an analysis of documents related to a particular government website was carried out. The MyMSD website was mentioned by one participant during an interview. The Ministry for Social Development (MSD) is the branch public service of the public service that deals with social policy. It also administers superannuation and other forms of income support. MyMSD is the web portal for the MSD. It was used by a participant as part of caring for her brother with an intellectual disability, for administration related to payments (ultimately impeding care because it lacked the information required). Two documents were selected to understand this

particular form service delivery and the values that underpin it: *The Strategy for a Digital Public Service*, which outlines the rationale and plans that shape the digitisation of public sector services, and a small section of the *MSD 2021 Annual Report* "Delivering high-quality services through excellent organisational capability" that covers the digitisation of social welfare services.

Older people's experiences of care are connected to larger actor-networks that are less likely to be perceived (Demant & Ravn, 2020) but nonetheless shape network conditions. One care relationship that all of the older people in the study had was with a general practice doctor, as well as with varied other health professionals. Aotearoa New Zealand has a publicly funded health system. The Ministry of Health is responsible for the administration of healthcare and is one actor that shapes the conditions of the interaction between participant and medical professional. Two Ministry of Health documents were included in the study, chosen for their relevance to ageing and health care technology respectively: The *Healthy Ageing Strategy* and the *NZ Vision for Health Technology*. The Healthy Ageing Strategy is a 2016 document that sets out a framework which directs how policy, funding, planning and service delivery decisions impacting older New Zealanders are made and implemented. The *NZ Vision for Health Technology* is a document developed following consultations with health professionals and consumers along with other stakeholders. The document guides NZ approach to digital health. The version of the document used for analysis was published in 2020.

4.2 Conducting research with human participants

4.2.1 Recruitment of human participants

The first group recruited to the study were people over 65 years who were living in the community and used digital technology. The recruitment notice (see Appendix C) was distributed through the electronic networks and on physical noticeboards of organisations and community groups that offer services to older people. One of the organisations that distributed the notice electronically was an advocacy group run by older people and dedicated to the well-being of older people. The notice was circulated to all of those who were on the group's mailing list which included people active within the group as well as those who used its services. Two social groups (one in the city the study was conducted in and one in the neighbouring town)

that hosted activities and outings for older people distributed the notice electronically. A charity that provides information and services related to older people's needs electronically distributed the notice and placed a copy in their local rooms. A physical copy of the notice was also placed in a public library and a local church. The different range of groups and places were chosen so that a wide group of people with different socio-economic backgrounds and different levels of digital technology usage would see the notice. However, many of the avenues used for recruitment were in the community or for people who were able to go out into the community. The community and advocacy groups were not targeted to people of a particular ethnicity. The avenues taken for recruitment shaped the make-up of the study cohort and the care networks that were visible in the study.

In total, 16 people took part in the study, six men and ten women. A full list of these participants (with pseudonyms) can be found in Appendix F. Participants self-selected to take part in this study by responding to the recruitment notice. One married couple participated in the study, so I interviewed them together, although they gave responses separately. Three interviews were conducted via video-enabled internet calling (Zoom). One was conducted using a combination of telephone and email. All participants were Pākehā (New Zealand European) or immigrants to New Zealand from the United Kingdom or America. Participants ranged from their mid-sixties to their eighties. Approximately half of the sample engaged either in paid work or regular volunteering activities. Others were currently in a period of slowing down, with one having very recently retired from work and two describing having stepped back from their volunteer activities as their own energy levels and perceived capability had decreased. There was significant spread across participants in terms of their activity levels and health. Six participants described having serious, on-going health issues. For three of these participants, all in their late 70s or 80s, health issues impacted their day to day lives and level of activity quite considerably. While chronological age is not an indicator of ability or level of activity, the older participants (that is, in their 80s) did have a markedly different experience to the participants in their late 60s and early 70s. They described having less energy. Through the interviews, these participants spoke of things that they could no longer do and discussed changes in their daily routines and cognitive and physical abilities.

The study participants had a range of relational, personal, and familial circumstances and the responsibilities held by those in the study were quite different. I did not specifically ask people about their socio-economic status. There was nonetheless variance across the sample in terms

of access to desired technologies and the degree of financial stress described in the interviews. While two participants described being quite limited by money, for most participants money was not described as a significant actor that impeded the formation of the care networks being studied. Three participants lived in villages designed for older people – two in units they owned, and one in a rental unit provided by a religious organisation. Six participants lived with their spouse. Seven participants lived alone at the time of the interview. Three of these participants had previously had boarders, grandchildren or flatmates living with them. One participant regularly had young travellers stay with him, arranged through an online matching platform. One participant lived with her adult daughter. One participant lived with her brother who had an intellectual disability. Two participants lived in very small rural communities with populations less than 3,000 people that were at least a 25-minute drive from the nearest city. Three people lived in or just out of a town 20 minutes out of a main city with a population of just under 20,000 people. The rest of the sample lived within a medium sized (population just under 90,000) New Zealand city. These differences matter for the research because different characteristics reflect connections to different kinds of actor-networks. They shape the kinds of actor-networks that can be traced through the participants.

All participants were a part of dense networks of people and technologies (among other actors). All engaged in care practices, arranging these networks to maintain the health and wellbeing of themselves and others. Care practices included activities such as meeting emotional and practical needs through maintaining communication over video-calling, using self-tracking devices as part of health and fitness routines, or using technologies to manage relationships with medical professionals. All participants had people in their lives that arranged networks in order to maintain their health and wellbeing. These people included spouses, close friends, siblings, parents, grandchildren, and adult children. In total, 13 of the sample had adult children, and many also had grandchildren. Two did not have children. One participant did not mention having children. For most of the participants with adult children, the children played a significant role in their lives and were instrumental in building and/or arranging care networks for them. Similarly, most participants were engaged in care practices for their adult children and grandchildren. Two participants had significant roles in the day-to-day, physical caretaking of young grandchildren. This included tasks such as looking after them during school holidays and undertaking tasks such as school pick-ups and so on. One participant provided care to her older brother with an intellectual disability. This involved tasks like managing support workers, finances, medical appointments. One participant took on these

kinds of care responsibilities for people in her life with disabilities. The types of care practices that participants engaged in and the ways they used technologies were shaped by the kinds of relationships and responsibilities that they had.

4.2.2 Ethics and participant safety

The dignity and safety of the human participants was of paramount concern, and guided the approach to recruitment, data collection, and data storage processes. Full ethics approval for this study was gained from the Massey University Human Ethics Committee (see Appendix D). The research was designed and conducted in a manner that would be inclusive for as many digital technology-users as possible within this stage of the life course. I strove to make sure that people were not unduly prevented from participating because of their ability, ethnicity, or socioeconomic status. The project was discussed with a Māori researcher. The conversation oriented me to some of the specific ways that digital technologies intersect with tikanga Māori, and impact upon sociality and health for kaumātua. Following this discussion, I took away the importance of being specific about the kinds of practices and technologies being studied. How care is understood, enacted, and named varies with culture. Being both broad and clear about the kinds of things I wanted to learn about in the recruitment was my way of ensuring that people from different backgrounds could see the study as applicable to their ways of life and practices.

The right to participate in the study was balanced with a research design that took into account participants possible vulnerabilities. People over 65 are not a homogenous group. Within such a large cohort of potential study participants, there will be significant differences in physical and cognitive abilities. All written material for dissemination was in large font and simple language was used. Being older is associated with greater incidences of disability and chronic illness (Williams & Cooper, 2008). Being in frail health and/or having cognitive impairment make an older person particularly vulnerable to research (Szala-Meneok, 2009). Most saliently for this research, such vulnerability could manifest physical or mental strain resulting from participation. Interviews were planned for 45 – 60 minutes duration to minimise such strain on participants. Participants received an information letter (Appendix E) outlining what to expect during the study ahead of participation so that they could make an informed decision about

participation. They had the option of being interviewed with a support person. Through the interviews, participants were made aware that we could stop at any time.

As an interviewer, I drew on skills gained working in aged care environments. Through the interviews, I was continually attuned to signs that the participant may be uncomfortable or tired. While as an interviewer I strove to be respectful of people's time and energy (and marked when we were coming up to 45 minutes and then an hour to signal an end), with many participants the conversation lingered on naturally. Based on their preferences, participants could opt to meet in a public space such as a local library (which has rooms which can be used for privacy), in their own homes, or via video-calling (Zoom). All participants received a koha (gift) as thank you for their intellectual generosity and their time. One participant was interviewed with an adult child present. This person did not sign a consent form. However, they were aware that the interview was being recorded and chose to contribute significantly. As such, I have included her comments with the interview data.

The main risk for participants associated with participating in this research identified at the outset was coercion or compelled participation. This risk informed how consent was approached. An information letter (Appendix E) detailing the purpose of the study and stressing that participation was not mandatory was sent to all participants prior to our meeting. During recruitment, I spoke to each participant by email or phone ahead of our meeting which enabled me to get a sense of each person's willingness to participate prior to meeting with them. Informed consent was gained from every individual. This included a verbal discussion of rights and responsibilities. It was made clear to all participants at a number of junctures that participation was not compulsory and that participants could withdraw from the research until up to two weeks after the interview. I stressed that this would not disappoint me or impede my ability to progress with the research in any way. This latter provision meant that if a person had been compelled to participate, they would have later opportunity to discretely withdraw.

As briefly mentioned above, the COVID pandemic, which began in early 2020 as the ethics application was being prepared, necessitated changes to the study. COVID specific procedures were developed and adapted to changing public health requirements. New Zealand had two COVID lockdowns as part of the COVID response. The first lockdown, in 2020, occurred prior to the interviews. The latter lock-down occurred in August 2021, after the interviews. Most of

the interviews were undertaken in December 2020 and January 2021. At this point, New Zealand had tight border restrictions and no COVID circulating in the community. The approach taken at this point was one of general caution. I kept hand sanitiser in my car to use before interviews. I rescheduled interviews if I had been in contact with anyone who was unwell and gave participants the option of being interviewed by video call. From approximately February 2021, COVID began circulating, with small outbreaks in the main centres. This necessitated a more considered approached. Keeping a distance from participants was another measure employed to minimise the chances of passing the virus on. While during earlier interviews, I stood quite close to some participants and watched them navigate through different programmes, in later interviews keeping distance became important. Masking was not a part of New Zealand's public health response during the time I was conducting the interviews. Similarly, the vaccine was not available to me at this time. As such, these are not mentioned as safety measures employed.

4.2.3 Management of older people's data

The approach to data management was to balance the privacy of human participants while making aspects of the analysis related to the roles played by technologies and organised in sociotechnical care networks clear. Signed consent forms were stored separately from the data, in a locked cabinet in a locked office. Interviews were recorded on a digital voice recorder. Recordings were transferred to a password protected hard drive. The interview recordings were then deleted from the digital recorder and will be destroyed entirely when the research is complete. I transcribed all interviews myself. Pseudonyms were used for all participants. Personal information about the health and lives of older people not involved in the study arose during the course of the interviews. This identifying information (for example, names of others) was removed from the transcripts. When entered into analysis software, transcripts were entered with their pseudonyms. Any identifying information was removed prior. When I observed technologies in use, no information that may identify the participant was recorded. The data was stored in a locked cabinet in a locked office. The exception was that during the six weeks from August 2021 when Aotearoa New Zealand had heavy COVID restrictions, the password protected hard drive was stored in my home.

4.3 Research design: Data analysis

There were two main analytic components: network mapping and thematic analysis. As discussed above, interface analysis was also employed as an analytic method. Network mapping and thematic analysis were chosen as methods of analysis highly suited to producing rich detail about sociotechnical care networks. Sociotechnical care networks are inherently multiple. Care is different things in different places because in different places it is enacted differently by materially heterogenous networks (Law & Singleton, 2014; Mol, 2002). Boundaries between different actors are created in the interactions between me (the researcher) and the objects of study (older people and technologies). In doing so, particular 'versions' of care are made visible. Network mapping was chosen as a tool to help me understand how people, technologies, and other actors relate to, produce, and destabilise care. Thematic analysis was chosen as a highly flexible approach that can be used with a range of different theories (Terry et al., 2017). It is a way of identifying, analysing, and describing patterns (themes) within data sets (Braun & Clarke, 2006). Thematic analysis was useful in enabling a rich understanding of how particular relationships and patterns repeated across networks and to further identify obligatory passage points (OPPs) to which many of the participants networks connected. Rather than two distinct processes, network mapping and thematic analysis overlapped.

4.3.1 Network mapping

Care networks of older people are densely connected with many other networks. Mapping all of these would be an insurmountable task. As Latour (2005) says, the ANT researcher would be travelling all over the place! As a researcher, I needed to make choices about where to start and which actors to follow. In identifying care networks, I was looking for interactions between human and non-human actors which contributed to the maintenance of a meaningful sense of well-being for older people, where an affective sense of care was an outcome for an older person, or where care for the older person was a goal organising sociotechnical networks (regardless of whether care or the maintenance of well-being was achieved).

I took a broad approach to care and well-being. This involved considering practices and relationships traditionally understood as 'care', such as those connected to physical health and

the activities of daily living (aspects of life related to satisfying basic needs including food, mobility, grooming, hygiene and so on). However, in keeping with the conceptualisation of care as an intrinsic, socio-material part of constructing everyday life, care was treated as much more than the maintenance of health and the management of illness. For example, the study also considered activities more commonly thought of as maintenance and repair as care (such as getting a device fixed). I was also interested in sociotechnical networks that contributed to or diminished an older persons emotional or psychological well-being and quality of life. Care as an organising goal of networks could be 'self' care (where sociotechnical networks are assembled by an older person) to meet their needs or to maintain a valued way of life or social role. I was also looking for networks established by others where care of the older person was a goal.

As Mol (2002, p. 15) beautifully puts it, "the stories people tell do not just present grids of meaning." The interview data offers both an insight into how people experience care and descriptions of interactions between human and non-human actors (Demant & Ravn, 2020). I used the interview transcripts and observation notes to map out the care networks of the participants. This involved treating the interview data in line with the principle of symmetrically, and not presuming a human/non-human hierarchy (Nimmo, 2011). From a practical perspective, the easiest way to map networks was to create network maps on paper. Actors, as explained in the previous chapter, are things that make a difference (Latour, 2005). Actors were noted during and immediately after the process of transcription (see Figure 1). This gave a sense of the human and non-human actors involved. Key actors and networks were chosen for inclusion in network mapping based on their ability to make a difference upon an older person's well-being. Descriptions of networks that did not fit this brief were not followed. For example, some people gave detailed descriptions of technologies they had used in the workplace. These interactions were relevant insofar as they were processes by which skills were developed, which impact how care functions. However, the specific interactions did not connect to the research question and were not mapped.

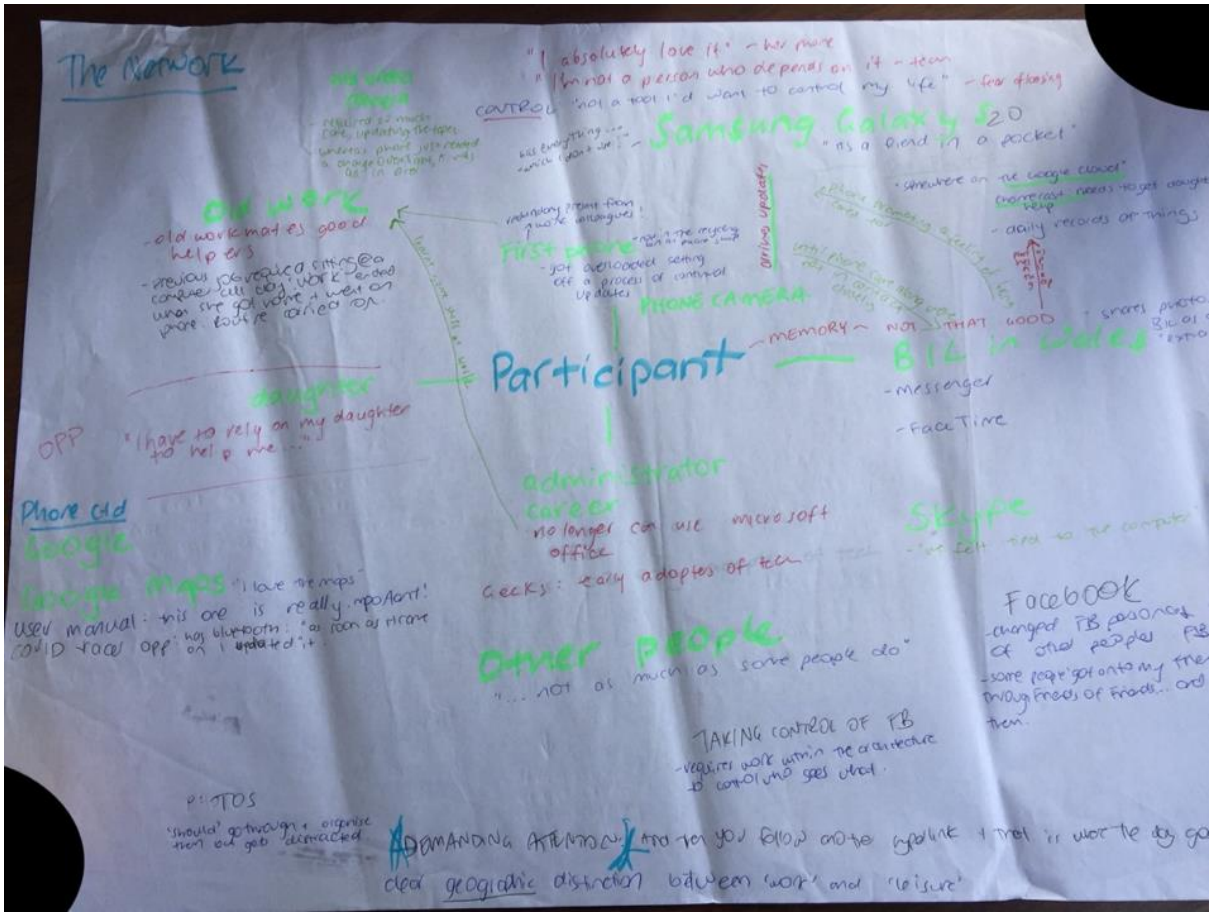

Figure 1 Network map made while familiarising

Network maps were then drawn based on specific effects (where well-being was achieved or destabilised) and intentions (a concern for well-being). As Payne (2017) notes, there is no standardised template for visualising networks. I used a discussion and example from Demant and Ravn (2020) as a 'jumping off' point. I noted down human and non-human actors that had been stabilised and appeared as a coherent, bounded entity. The connections between these actors were explained. Important actors that had been translated by each actor were marked out. Potentially destabilising actors (actors that could prevent care and well-being from being achieved) were marked out. A core part of analysis is identifying obligatory passage points (OPP) and identifying translations. OPPs occur when one actor is established as a point through which all other actors in a network must 'pass' (Teurlings, 2013). OPPs were identified when actors were described by participants as something that *had* to be used in a care network, actors that a care network would not have been able to function without, or actors that many different participants care networks connected to.

The purpose of the mapping task was to understand the actors that make up care networks and how they relate to one another and care for the participant concerned. For a simplified example of this process, in the excerpt that follows, participant Hilary describes what she values most about her technological set up. Hilary is in her mid-60s and lives alone. Her family, including children, a sister, and her parents, all live in another country. A number of actors and interactions can be identified:

> "um I think being, staying in touch with people. Like especially with Skype. I mean, I would have to remember like really, sometimes 'oh it's been a year since I've actually seen my parents'. It's actually been a year since I have been to the house. Because I look at them and my mom is at her desk and it's her, their bedroom that she is in. And I look and my dad would, when he was alive there, he would, coz she would always talk around bedtime so he would be going to the bathroom and you'd see him walking round in his skivvies. You know coz he'd be in the bathroom, you couldn't see him really in the bathroom, but you'd know because he would be going to bed and he would be talking … coz her desk is in the bedroom and his desk is in another room and stuff. So I think that."

'Staying in touch' contributes to Hilary's well-being and is something that she values. In this sense, the network is considered a care network - the network Hilary describes is a set of material relations and practices that produce care as an affective sense and maintains 'close' familial relations necessary for Hilary's quality of life. The feelings of being cared-for, of concern-for and responsibility-for, have material consequences: they are realised in social and technical relations (Puig de la Bellacasa, 2017).

Key actors were identified as those which contribute to the achievement of care. I have functionally distinguished between different actors where it made sense to do so, as per van Dijck (2013). Such distinctions were made based on analytical significance – an actor was named as something that modified whether, and how, well-being could be achieved for the participant. Actors were sometimes mentioned directly in the text. Key actors mentioned in the fragment of text above include Hilary, her parents, software (Skype), a location the call is made from (parent's bedroom, bathroom), a time of day (evening), and clothing (skivvies). Across the interview, other actors that impact upon this sense of care are mentioned (such as devices and other people). Hilary's sister and children help with technological set-up. The laptop and PC are able to host Skype, a software programme enabling web-based video-calling. This

means Hilary and her parents can see and hear each other. The time of day, location in the house, and clothing all make a difference to Hilary's affective sense of care by contributing to a sense of intimacy. Care networks were mapped as such, identifying actors that produced particular kinds of care as 'one' of the participants care networks.

Not all key actors are identified so literally in the interview data. Actors in some instances were identified based on descriptions of their effects. Further, the data contains descriptions of translations, where of actors have been bought into co-existence and ordered so they appear as stable entities (Law, 2008). For example, the laptop Hilary uses are comprised of many different actors that have been successfully translated. It appears as a distinct, bounded object. However, notable actors that have been translated can be delineated for their capacity to impact upon care. The camera is analytically significant in this network because it enables Hilary to see her parents. The laptop is networked in the computational sense: it can connect to the internet and to other devices. The internet, in this instance, is an actor-network. I have used the term actor-network to indicate where different actors and their roles cannot be clearly defined (Latour, 2005). In the case of the care network fragment described above, making analytical distinctions is not significant insofar as the effects produced by particular actor networks are what matters for how care functions for Hilary. A visual representation of Hilary's care can be found in Figure 2.

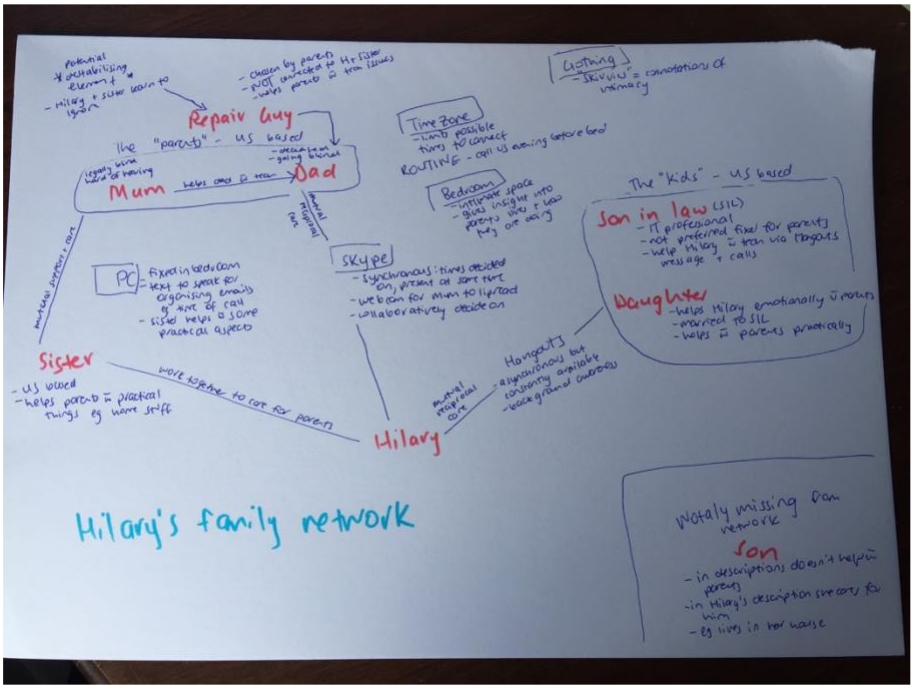

Figure 2 Hilary's family care network

Translation was a concept of particular significance in identifying how care networks formed, how they functioned for older people, and why they functioned as they did. When a successful translation had occurred, the actors in a network functioned in accordance with the goals of one actor (the 'network builder'). The participants translated actors. But they were also simultaneously translated by other actors. Using Callon's (1986) process, I searched for four movements and phases of translation to identify when translation occurred. In the first phase of translation, a problem needs to be identified for care. A problem for care, in this context, is a concern or issue related to the well-being of an older person. The concern could have been identified by an older person themselves (for example, for a participant with health conditions, being able to get groceries without exposure to the COVID virus was a problem), by another person in their lives (for example, an adult child may have concerns about their parent living alone), or by another actor (for example, a technology provider presenting a lack of physical activity as a problem for older people).

In identifying a problem, identities are created for relevant actors – the second phase of translation. In the case of an adult child being concerned about their parent, for instance, the older person is stabilised as an 'at risk' subject. The digital technology takes on an identity of care technology. The third phase is enrolment. In this phase, network roles are created. Negotiations take place between different actors within the network – actors do not take up their roles without a fight, and actors make transformations as they take up roles. Devices and apps have particular capacities that shape the care roles they take up. The 'at risk' older person accepts particular kinds of usages of digital technology. Guided by Outila and Kiuru (2021), in these second and third stages I was closely attuned to the way that interest was raised in technologies and particular uses of digital technology were supported. Finally, if successful translation occurs, the network will function in accordance with the goals of the network builder. The network may support the well-being of the older person, achieve an affective sense of care for the older person, or it may undermine their well-being and make an affective sense of care harder to achieve.

4.3.2 Thematic analysis

A thematic analysis was undertaken as a means of data analysis. The data for each participant was analysed individually, but also as a 'set' with the analysis of policy documents and marketing materials. The first phase of the thematic analysis is familiarisation (Braun & Clarke, 2006), which for the interview data occurred during and immediately after transcription with the initial network mapping. Initial thematic analysis of documents was carried out as they were enrolled. In the second phase of thematic analysis, initial coding was carried out (Braun & Clarke, 2022). This involved generating codes which spoke to particularly salient features of sociotechnical care networks (Saldaňa, 2009). I used NVivo to keep track of these codes.

Codes were arrived at in different ways. One batch of codes were 'semantic' codes. These codes were descriptive, simply collecting together similar, salient sets of statements (Braun & Clarke, 2022). For example, all descriptions of 'disposing of old technologies' were grouped together using NVivo as a way of keeping track of them. This meant I could read through all of the participants discussions together of how they went about (or not) and how they felt about disposing of their old technologies together. The purpose of bringing together sets of statements like this was that it enabled me to see key commonalities across networks. Other codes were collected to help identify semiotic actors. These 'latent' codes captured more implicit meanings (Braun & Clarke, 2022). Here, more attention was paid to the language participants and documents used. Further, attention was paid to what was not said, or what was implied, as a way to explore more complex dynamics related to how network roles were being created by different actors for study participants.

In the third phase of thematic analysis, clusters of codes that shared similar, broad meanings were grouped together as themes that spoke to the research question (Braun & Clarke, 2022). Rather than using NVivo to group codes together into broader themes, I first made mind maps on paper. This involved writing the codes down and trying to link together codes around 'bigger' ideas. Once I had a sense of how different codes could relate, I created tables in Microsoft Word. In these tables, similar themes were grouped together. For example, 'disposing of old technologies' was grouped together with the code 'technology ageing' which collected together all descriptions of what people noticed when their technologies were getting 'old'. This was then connected with other codes mentioning time, such as descriptions of managing time. During the process of developing themes, I made continual comparisons and references to the network maps and interface analyses. This process ultimately identified four

themes that reflected core dynamics and tensions related to how digitally mediated care functioned for community dwelling older people: 1) the complexities of connection; 2) the tension between independence and dependence; 3) the elusiveness of empowerment; 4) the temporal dimensions of care networks.

4.4 Conclusion

Using interviews, observation, and document collection I generated data about the digital care networks of older people. Network mapping and thematic analysis enabled me to make sense of this data. Additionally, interface analysis was used as an analytic method. While this network of methods is unconventional, it enabled me to generate rich detail about sociotechnical care networks and how they functioned for older people, charting relationships between people, technologies and other actors.

The analysis section of the thesis follows. Each analysis chapter reports on the network mapping exercise and thematic analysis. The first and third analysis chapters also draw upon interface analysis. While the chapters do not solely draw on thematic analysis, for practical purposes the four key themes have been used for organisational purposes to structure the discussion.

Because the approach to conducting and reporting on the research was inspired by ANT, descriptions of messy, heterogenous, and overlapping networks are contained in these next four chapters. The chapters that follow encompass intimate details of relationships between people and technology. An understanding of technology, of course, cannot just be gleaned in terms of its context of use (Latour, 2002; van Dijck, 2013). As was outlined in the last chapter, the PE approach has been employed to make sense of organisational structures that impact upon care. Reader, be warned. There is lots of movement across networks ahead!

5. Connection as care and complexity

Digitally mediated connection, and its benefits, forms, and challenges, recurred as a key thematic concern in the participant interviews and document analysis. Connection has multiple meanings that are often conflated in practice. Connection can refer to social connections (having relationships with other people, through friendships, family, or other social ties) and the sense of social connection (a *feeling* of closeness to other people). Connection can refer to technical connectivity. This encompasses being a user of digital technology as well as the process of establishing connectedness through technology. Connection can also refer to automated connection, such as the connections between users made by the algorithmic architectures of social media (van Dijck, 2013).

Drawing on Ito and Okabe (2005), who originally used the term 'ambient virtual co-presence,' as well as Madianou (2016) I discuss 'ambient co-presence' as a particular kind of digitally mediated connection. Ambient co-presence refers to the persistent, background awareness of other people that networked, digital media engenders. At any particular moment, older people are able to contact another person, which contributes to a sense of affective care. This form of social connectedness enabled by digital technologies was immensely important to participants' well-being – a form of connection as care. Social connectedness (and as the next analysis chapter highlights, independence) were what participants valued most about digitally mediated care.

This chapter combines the thematic analysis of the interview data with network mapping. The discussion moves between the networks of the participants and the densely connected actor-networks to which they connected, such as the state and technological service providers. I demonstrate that while immensely valued, connection was incredibly complex. Connecting older people in the technical sense was found to be a goal of both state and commercial actors. Automated connections shape how older people experience care. Establishing and maintaining connection as care could be immensely challenging for participants.

5.1 Connection as care

When digitally mediated care functioned well for participants, it engendered a sense of social connectedness. Participants really valued being able to 'stay in touch'. Email was 'a great connection'. Smart phones were deeply appreciated as the 'connection to an outside world'. The state of being connected was described as something positive, spoken about by the study participants in terms of 'love', as 'wonderful' and 'important'. From the perspective of participants, achieving social connectedness was dually important in achieving care. Firstly, being able to maintain relationships with friends and family (often, despite geographic distance) contributed strongly to an affective sense of wellbeing. Secondly, digital technologies enabled participants to draw on people for support with more practical tasks.

Digital technologies were useful for operationalising social connections by way of choreographing relations necessary to undertake a particular task or activity related to care. One way social connections were drawn upon was through accessing in person support with everyday tasks that were difficult for a person to achieve. For example, a participant who no longer drove organised rides from her daughter. Support with practical tasks did not have to be given 'in-person'. Digital technologies enabled people connected to participants to provide practical support at a distance. Many participants' adult children or grandchildren provided IT troubleshooting over the phone. In these kinds of network relations, participants were in positions of 'caring for' as well as being 'cared about'. The notion of connection as care expresses a situation when connections between a number of human and non-human actors enables well-being.

Particular qualities recurred in participants' accounts of network arrangements that generated a sense of connection as care: closeness, intimacy, visuality, synchronicity, and frequency. Digitally mediated care can generate a sense of closeness and intimacy through a sense of 'telepresence', the feeling and experience of being in the same room at the same time despite geographic distance (Knudsen, 2002; Pols, 2012; Sävenstedt et al., 2004). For example, for Hilary, video-based calling enabled an intimate sense of co-presence. This co-presence was 'virtual' in the sense that the parties are in separate locations and 'material' in the sense that the visibility of particular signifiers was important for producing a sense of closeness. Hilary is a professional in her late 60s. Her children and her mother live overseas. Her father has recently passed away. At the time this interview was conducted, international travel was heavily restricted due to the COVID pandemic.

In this comment Hilary describes what she values most about her technological set up:

> "um I think being, staying in touch with people. Like especially with Skype. I mean, I would have to remember like really, sometimes 'oh it's been a year since I've actually seen my parents'. It's actually been a year since I have been to the house. Because I look at them and my mom is at her desk and it's her, their bedroom that she is in. And I look and my dad would, when he was alive there, he would, cause she would always talk around bedtime so he would be going to the bathroom and you'd see him walking round in his skivvies. You know cause he'd be in the bathroom, you couldn't see him really in the bathroom, but you'd know because he would be going to bed and he would be talking … cause her desk is in the bedroom and his desk is in another room and stuff. So I think that."

Key actors mentioned in this example are Hilary, her parents, the devices being used (desktop, laptop), features of the device (web cam, capacity to connect to internet), software (Skype), a location the call is made from (parents' bedroom), a time of day (evening), time zone, and clothing (skivvies). In the interview with Hilary, other relevant actors were identified as Hilary's sister, and an IT repair person. Together, this network engenders a connection between Hilary and her parents – in both the technical and affective senses – that ultimately produces care.

Visuality and synchronicity are particularly important for the felt sense of connection as care (typified by closeness and intimacy) that Hilary describes. The web camera means that Hilary can see her parents and situate them in space. Because the desktop has been placed in the bedroom and cannot move around the house as simply as a smaller device like a laptop could, Hilary sees a space in the house (the bedroom) that is considered less public than other living spaces like the lounge or kitchen. The bedroom space has connotations of intimacy. Insofar as place is a significant actor in the production of emotions (Sihto, 2018), the place in which her parents take the call shapes how Hilary experiences connection as care. Having the call in the evening means that when Hilary calls, her parents are undertaking their night-time routine. The clothes being worn ('skivvies') are not generally clothes worn in public spaces. The clothes are important for the sense of close familial bond.

Taken together, an intimate vision is produced by these network interactions. In Hilary's description, she feels as if she is there at the house with her parents. This reflects the sense of synchronicity that can be a feature of network arrangements that generate connection as care. The webcam in and of itself does not create this experience, but its capacity for visuality makes these unique kinds of emotional experience possible (Pols, 2012). The sense of connection as care that Hilary feels would be different if she were to speak to her parents on the phone or actually be in the same room as them.

Establishing a sense of connection as care has both practical and emotional consequences. The network configuration Hilary describes means that she gets to obtain a rich perspective on her parents' lives. She can observe changes in their bodies or private space that may not be visible over the telephone, or even to a person visiting the house. She can be attuned and responsive (Puig de la Bellacasa, 2017) to their physical as well as emotional needs despite distance. This experience of caring for at a distance is not the same as proximal care (Sihto, 2018). Acting upon practical aspects of care requires Hilary to coordinate with her sister, who is based in the same geographical location as her parents (another form of connection necessary for care).

Connection as care is reciprocal. Hilary, in relation to her parents, is both carer and cared for. In this sense, her experience was unique (as the only participant who spoke of a care responsibility for a parent at the time of the interviews). Yet connection as care is always bi-directional, to greater or lesser extents. In this example, there is an absence of Hilary's parents' perspective. Based on the interview data, whether they experienced these relations as too much closeness or intrusion (Pols, 2012) is outside of the remit of the study design. Regardless, for Hilary, this sense of having her parents' intimate presence in her life contributes positively to her wellbeing. The emotional experience of connection as care is situated and contingent upon the network dynamics, as participants used different digital technologies and moved between positions of caring-for and caring-about.

While intimacy and a sense of closeness are integral to care in the example above, they are not generally a prerequisite for care to arise. A sense of synchronous co-presence, of being with someone in time, that contributes to well-being and is linked with caring for and being cared about, is also engendered in less intimate interactions. To illustrate this, I will use an example of Corrina and her friends providing support to another friend (Jean) during a difficult period

where she was confined in COVID isolation for an extended period of time. Jean did not have COVID, but the situation was very stressful. A group of Jean's friends got together and collectively shared the task of messaging her:

> "This whole conversation was done through Facebook [Messenger], while Jean was [confined]. She had a group of friends. So it was some of us who knew her from New Zealand, some of us who knew her from Australia. She's lived in Australia for the last 28 years or so. So we each, I started early in the morning because I was the first one up. So we just kept in contact during the day with her, so that while she was in solitary she had people from all round the world going, letting her know [trails off]"

The group engaged in continuous communication with Jean. The group used text (ranging from single word messages to longer paragraphs), stickers (still or moving images that can be chosen from the messenger interface), and photos (taken with smartphone camera apps, generally of everyday situations such as meals).

While technically Facebook Messenger used in this way is asynchronous, messages were often sent in real time. As Corrina describes, a person would dedicate a period of time to being 'in' the group chat, sending and responding to messages from Jean as soon as they came. The communicative affordances of Facebook generated a sense of ambient co-presence for Jean, a sense that no matter the time of day, somebody was there to talk to her. From Corrina's perspective, the purpose of participating was to care for a friend – to offer her both company to fill the days and a space to vent. This example again highlights that the emotional experience of care is situated. How connection is experienced is shaped based on the type of technology being used, but also the particular patterns of usage.

In other instances, it was the frequency of contact that mattered considerably for whether connections were experienced as care and the extent to which they could contribute to wellbeing. Frequency of contact was a site of negotiation for many participants. In-person contact was limited for some participants because of family being overseas and the COVID context. For some participants (particularly those older participants), there were other limitations (such as limited mobility) on the extent to which they engaged in social interactions. Digitally mediated social connections were particularly important in this context.

The affective benefit of frequent contact is exemplified in the following quote from Viola. Viola is in her 80s and lives alone. She has two daughters, one who lives a six-hour drive away ('J') and one who lives overseas ('E'). Viola lives with health conditions which shape her experience of social connection. As she has limited energy (and at the time of the interview an injury) going out or hosting visitors can be challenging. Viola explains:

> "It really does make a big difference when you are 80 years old and on your own! I mean I've got lots of lovely family and friends but just being able to contact them [her daughters] whenever I like."

While Viola does describe having many different social connections, her in-person instances of social contact are now heavily restricted. She speaks to other family members and a close friend over the phone, Skype, and Facebook Messenger but this is less regular (and her sister now requires support from her daughter to get to the phone). The chats she has with her daughters occur frequently. Contact takes place via a mix of phone calls, video calls, and text messages. Often, instances of contact are not an event, but happen spontaneously. For example, Viola will send a text message with words and an emoji when she wants to let her daughters know she is thinking about them during the day. In this instance, it is the spontaneity and frequency of contact that makes a difference to Viola's sense of connection as care. The ambient co-presence created gives Viola a valued sense of company.

Connection as care that combines emotional and practical support can function as a form of careful surveillance. Careful surveillance denotes the use of surveillance within caring relationships (Richardson et al., 2017). Establishing connections through which continual checking in can occur is made possible by digital technologies. For older people, careful surveillance can generate a sense of freedom and independence. The practice of continually checking in throughout the day affords the sense of a strong connection to another. This affective experience of being connected to emotional and practical support was an important component of being able to remain living alone for some participants. For Viola, the frequent conversations were a key source of company necessary for her well-being. Particularly with her daughter J, these conversations also functioned as a space where more practical decisions connected to health and negotiating day to day problems could be discussed. While discussing medical care, Viola mentioned a conversation with J that she had had because she was feeling worried that she was more tired than usual and 'couldn't be bothered eating'. J had told her not

to worry and that it was probably the heat, but to mention it to the practice nurse with whom Viola had a good relationship.

The frequency of contact, where the relationship between Viola and her daughters unfolded across a number of different communication applications rather than just video calling, had largely been established by her daughter J:

> "When I get up, the first thing I do when I get up is look at my phone. Because I was very bad with my phone until J came back to NZ. Because, you know, I'd forget to look for messages and things you know. So I always look at my phone and it has ended up being, you know I wasn't very good with it, but I have improved a great deal"

This quote describes how Viola has tailored her schedule in order to meet an expectation of frequent engagement. Viola's daughter J played an instrumental role in setting this pattern of engagement through reminding her mum to look at her phone. The quote highlights two significant analytic points: it frames being a care recipient in moral terms and emphasises the different ways connection as care and careful surveillance are experienced based on positionality in the care dyad.

While connection as care can be deeply meaningful and valuable, there is also a degree of responsibility to be connected for care. At the most general level of analysis, it was evident that being seen as a person who has close social connections was understood as a good thing by participants. Participants strongly valued uses of technologies that enabled connection to family and close friends. It was the kind of practice that most participants highlighted, a way of using technology that was particularly valued. The use of 'good' and 'bad' in Viola's quote above also implicitly suggests that there is a moral dimension to connection as care. There are broader relational dynamics that likely influence this. Viola's daughters had wanted her to move to J's city, but Viola felt that she was not ready for that. She wanted to stay living in her small town. Connecting to her daughters, and learning a new way of engaging in communication, (while not explicitly named by Viola as such) is one way that she can show she is still managing on her own. Speaking more generally, for an older person wanting to remain living alone, the stakes of not performing 'connectedness' adequately can be high. Having connections in place for affective and practical support contributes to well-being but is also a marker of good citizenship and the ability to self-care. The 'good' kind of person is the kind of person that has these connections.

How connection as care is experienced is shaped by the affordances of technologies and how those technologies are used, as well as a person's position in the care relationship. Closeness, intimacy, visuality, synchronicity, and frequency are evident as qualities in connections that produce care, but connection as care ultimately requires negotiation across each of these domains. How this negotiation is experienced is dependent on relational dynamics. In the interview data, only the perspective of the participant is highlighted. As mentioned above, the interview data cannot speak directly to how the other party experiences caring relations. Viola's example highlights that being cared for with technology required her to adapt the frequency with which she engaged with technology. Viola set her level of engagement to match her daughter's expectation. Being connected in this way was ultimately experienced as a meaningful act of care for Viola. How her daughter experiences this cannot be gleaned from this data. Frequent connection in this way does not automatically equate to care and benefits for each party. The negotiations related to connection as care were not always so easily resolved. Connection as care created some novel problems for participants. A meaningful and satisfactory level of contact for one person can be experienced as intrusive by another.

Having a background awareness of others for one participant notably intensified the pressure of informal care. Participant Janet was very ambivalent about her mobile phone. Janet is very engaged in volunteer work and did not want her phone to ring during a meeting. She had worked out how to turn the ringer off. When she gave her number out to people, she would tell them to text message her. The reason for this was:

> "Sometimes I can feel it vibrate if someone is calling me on the phone. And I, um, have a partial level of care for [Ellen, a woman with a disability]. And she even though she knows to text me and she is very literate, she likes the immediacy of a phone call. Because she lives alone. So if I get a call it is usually from her. And so in that case, it's just that she needs to make contact. Because she lives on her own and just the nature of her life means that if she gets an idea in her head, she wants resolution."

These calls are not urgent calls. There are other avenues in this care network in place for emergencies. But part of caring for Ellen is that Janet is the person she turns to when she has an idea. Because Janet knows that it is Ellen calling most of the time, if she does get feel the vibrations suggesting she is getting a call, she treats it as if it is from Ellen and makes a decision about answering it based on what she is doing. Getting the mobile phone in the first instance

had been suggested by Janet's family. Once she had the phone, significant negotiation was required to figure out how to make it work for her. The example highlights the situated nature of connection as care. Presumably for Ellen, the experience of being connected contributes to her well-being. However, for Janet, connecting as part of a care relationship was considerably more fraught. Constant awareness of Ellen was something that she needed to negotiate in order to maintain her own well-being. Connection as care is a site of negotiation and could be a site of significant tension.

The phrase 'being connected' can imply a particular state (as in, I am connected) but it can also imply a particular translation (as in, I am being/have been connected). In the latter instance, one actor has had a network role created for them, which impacts which other actors they encounter and under what circumstances. Deciding upon which platform to use for maintaining communication was a site of negotiation. In some relationships, this was a site of trial and error, where different platforms had been used until one was found that everybody liked. Many participants mentioned that their adult children had decided upon the platform used for family communication, and the process of establishing connections had been about learning to adapt to that particular platform.

For some participants, the platform used with a significant person in their network went against their communicative preferences (and in some cases caused practical difficulties). An example from Corrina highlights this. Her daughter had recently moved in with her, so their communication mode of choice was now "bellowing". However, before they lived together, they lived in separate cities and would communicate via text message. Corrina explained why:

> "Because she chose it. She preferred to use text rather than Messenger. I would have gone for messenger. Her best friend, who is like my other daughter, she Messengers me. But my daughter prefers the text. So that is why".

When prompted to say what she liked about Messenger, Corrina said:

> "Oh. It is the closest you can have using technology to actually talking person to person. Or face to face. And in fact, when you go on to the. On to the. From just typing it in, to saying "speak to me" it is [trails off]. They are in the room with you"

Messenger, for Corrina, produced a different emotional experience than text messages did. She articulates quite directly an experience of telepresence using the app. The connections that Corrina makes through Messenger (with her brother-in-law, some friends, and the family friend

mentioned in the quote) are deeply meaningful for her. While in some senses this a comparatively minor issue of preference, the example points to the kinds of negotiations that characterise connection as care and the ways that any number of decisions made can affect whether and how this is achieved. Power, as understood in this thesis, is about being able to influence and organise how other actors are configured. How digitally mediated care functions for older people depends, in part, on the extent to which they can manage their connections to others.

5.2 Connecting as a state care practice

Establishing connections can be a way of realising care. Underpinning connection as a care practice is the notion that being connected is something important. Thematic analysis of government documents as well as technological marketing materials suggested that older people's connections in the general sense are a site of significant concern. Older people are positioned at particular risk of being 'unconnected' and being unconnected is positioned as harmful. Establishing digital connections for older people is a priority for the Aotearoa New Zealand government.

This is reflected in two key documents: The *Better Later Life* (2022) strategy and the *Digital Inclusion Blueprint* (2019). The *Better Later Life* strategy is a document by Te Tari Kaumātua, the Office for Seniors. It outlines the priority actions and values which underpin policies made across different government departments as well as public sector service delivery related to ageing in Aotearoa New Zealand. The *Digital Inclusion Blueprint* defines digital inclusion, presents the context and vision of digital inclusion, and sets out the roles for the government. Digital inclusion refers to the capacity for people to participate in, contribute to and benefit from the digital world and is understood across four domains skills, motivation, access, and trust. The *Better Later Life* strategy frames digital inclusion as a relevant work programme for older people, as part of realising visions for improving social connectedness. The *Better Later Life* report positions social connections as crucial for older people:

> "Being connected and having meaningful relationships with family, whānau, and our wider community is critically important for our wellbeing as we age. Older people can experience loneliness and social isolation, which contribute to poor mental and physical health outcomes. There are many reasons for this, which means different

approaches are needed to address these issues." (p. 34)

Digital inclusion is positioned as a solution to the risk:

> "Technology can offer significant benefits and increase our ability to age in our communities. Things like smarter homes and gadgets/apps to monitor health can increase independence and reduce the need for support. Technology can also help us stay socially connected and in touch with family, whānau and friends." (p. 39).

Better Later Life is framed as a report developed in consultation with older people and stakeholders. It translates these groups and speaks for them. The first extract emphasises the importance of connectedness. 'Critically' in this context speaks to the immense importance placed on social connection. The quotes link together digitally mediated connections with individual well-being and the avoidance of negative health outcomes. Independence, reduced need for support, and having strong social connections are presented as things that are desirable. Technology is presented as having some risks (notably connected to scams) but ultimately as able to realise these goals. Foregrounding particular ways of using technology (such as smart homes and monitoring devices) orders future networks – it shapes future policies, interventions, and service delivery.

The way that independence is presented in this document, linked with health monitoring and smart homes, is very distinct from how participants understood independence. As discussed in the next chapter, participants tended to frame independence in terms of being able to do things themselves using technology. In contrast, how connection is framed here resonates with the sense of importance participants afforded being in touch. The discrepancy between how independence is framed between participants and *Better Later Life* suggests that independence has a less precise and normative meaning than connection.

Being unconnected is framed strongly in terms of deleterious consequences that older people are particularly at risk of. The *Digital Inclusion Blueprint* was created as a work programme for digital inclusion by Aotearoa New Zealand's 'digital government' initiative. Part of the purpose of the report is to clarify the role of government in ensuring that all New Zealanders are digitally connected. The *Digital Inclusion Blueprint* is intended for government departments, service providers, and other stakeholders connected to digital inclusion work programmes. The *Digital Inclusion Blueprint* draws on other research and reports to articulate

the importance of digital inclusion, suggesting that those who are not digitally included are missing out and negatively impacted:

> "People who cannot access and use the internet are increasingly at a disadvantage. The November 2018 report Out of the Maze: Building Digitally Inclusive Communities is based around stories from New Zealanders who face barriers to digital inclusion. Interviewees described the impact of not being able to access the internet as exclusion, isolation, powerlessness and limited opportunity (Elliott, 2018). The report emphasises that "losing the ability to be digitally connected could have a disproportionately disastrous impact on people in vulnerable or tenuous times, or when moving through a life transition" (Elliott, 2018)." (p. 7).

This extract speaks to the way that being digitally unconnected is a negative experience. In using terms such as disadvantaged, powerlessness, isolation, and exclusion, a negative and stigmatising frame is invoked. Older people are mentioned in the *Digital Inclusion Blueprint* as one group particularly at risk of being digitally excluded.

The value placed on being connected via digital technologies is evidenced by government spending on digital inclusion programmes. Digital inclusion is positioned as a basic condition for being part of an imagined future collective where digital technologies are widespread. Government spending in this area relates to enabling equitable participation. Digital inclusion is positioned as ensuring that people have the tools they need to contribute. To be unconnected is to be isolated from connective opportunities. The benefits of digital inclusion are not just individual well-being. The report suggests that universal digital inclusion could have a one-billion-dollar economic benefit. In this way, connection is implicitly a kind of population-level care practice improving individual and collective well-being.

While connecting is a site for intervention, insofar as there are work programmes designed to ensure older people's connections, there are limits to how the state imagines its role facilitating these connections. It is particularly notable how *Better Later Life* positions digital inclusion related to older people, using language that does not explicitly guarantee older people nondigital alternatives for meeting their needs:

> "Different ways of accessing government services that meet the needs of all older people (e.g. face-to-face and online) are considered." (p. 39)

Similarly, digital service design that is inclusive of the needs of older people is encouraged. The *Better Later Life* report also states:

> "Innovative technological solutions that help older people, and digital design that addresses their needs is encouraged." (p. 39).

Encouraged here is very different than compelled. Older people have to engage with a number of different digital technologies in order to meet their social, health, and administrative needs. Alternatives are not guaranteed. It is notable that the section on digital inclusion is placed directly above a section on 'responding to change' which foregrounds resilience. A chain of associations can be identified between the moral positioning of being connected as something good in the interview data and the way in which digital inclusion and connection are positioned. Reducing the need for support and preventing adverse mental and physical health outcomes, at a population level, are cost saving measures. Ultimately, fostering strong social connections make it easier for older people to access practical help and support without government intervention. As the participants position themselves as 'digitally connected' people, they take up a role that is in part created by neoliberal, anti-welfarist ideologies which also shape how the state understands connection and digital inclusion. How digital care functions for older people is directly impacted by these kinds of state-level decisions made about how public and private sector services are technologized.

5.3 Connecting as a commercially available care practice

Notably, older people's digital connections were also positioned as a site of concern in technological company marketing. This became particularly evident when following the actors involved in Keith's sociotechnical care network. The 'Muse headband' is a headband that is fitted with sensors that detect electrical activity in the brain which act as a proxy for stress/calm states. The headband partners with an app featuring guided meditations and 'soundscapes' that determines content based on headband data. An analysis of Muse marketing materials including blog posts and the website was conducted. Connection is presented in these materials as very important:

> "Human beings have an immense need for connection. The isolation we experienced during a world pandemic has brought us closer to understanding that the feeling of loneliness and the fact of being alone are two very different things. It is undeniable that humans are social creatures and we need to interact with others for our mental health.

> However, one thing that research also shows us is the importance of spending time alone, in order to connect more deeply with ourselves." (Muse, 2023c).

Connection is presented by the company as a fundamental human need. All human beings need connection, and technologically enabled mediation is positioned as enabling those connections. The headband is also marketed as a tool to help reduce stress, improve focus and sleep better through a better understanding of brain activity and more efficient meditation practices.

Keith, who is in his early 70s, uses the tool for meditation. He explains:

> "I put this thing around my forehead, it picks up what is happening in my brain. And then I deep breathe for half an hour … that's how I meditate. Cause, like you can tell that I live in the fast lane in some ways and I have to slow down. So the Muse headband at the end of it says 'good on you, you've done a great job' no matter how badly [inaudible]. And then I press the button and it says 'ok here's the graph you were calm for 7 minutes, or 15 minutes, you were neutral for x minutes and you were awake for so many'. So. If I have had a tense, rushed day it might only say you only got down for 2 and a half minutes. But at least I got down for 1 and a half minutes! Which is good. So it's, these things guide me. So that now I've done my meditation I'm clear. My routines are done. I do those things every day for health and longevity."

Keith has many hobbies, attends many online events, and is a crypto-currency investor. He is passionate about technology and longevity and is an active older person who has built a selfcare network to sustain his way of life. The way that Keith uses the product is in line with how it is marketed – as part of a meditation routine he engages with to keep his brain functioning optimally. What is particularly interesting is how Keith's use of the device differs from how the marketing of the device imagines that it will be used by older people.

There is a notable difference in the Muse headband's marketing regarding how connections are imagined as a potential problem based on age. Generally speaking, the target audience of this product is assumed to be younger. On the most prominent web page, the home page, the people represented are younger people (see Figure 3). Older people are much less visible in the imagery associated with the product, although there are some more diverse age ranges through the site (see Figure 4). The headband promises better sleep, better focus, and more feelings of calm (Muse, 2023a). In this sense, it can be understood as a care response to the problems of the digital economy including stress and an inability to switch off. The product will give

"presence of mind" and help the user "tune into [their] body" (Muse, 2024a). The product is positioned for people who, as Keith put it, "live in the fast lane". Generally, the person who lives in the fast lane is imagined to be a younger person. This person is always connecting across a network of machines. Their brain has been 'sped up' by the processes of networked capital (Berardi, 2010). The headband enables this imagined younger user to restore and re-connect to themselves.

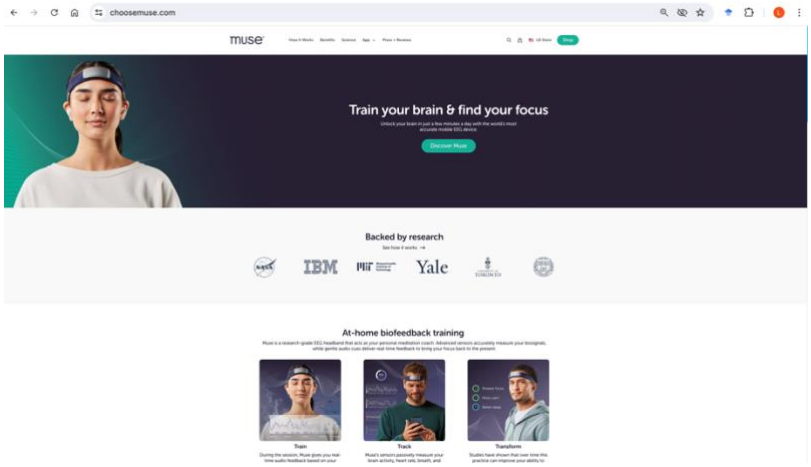

Figure 3 Muse home screen 2023

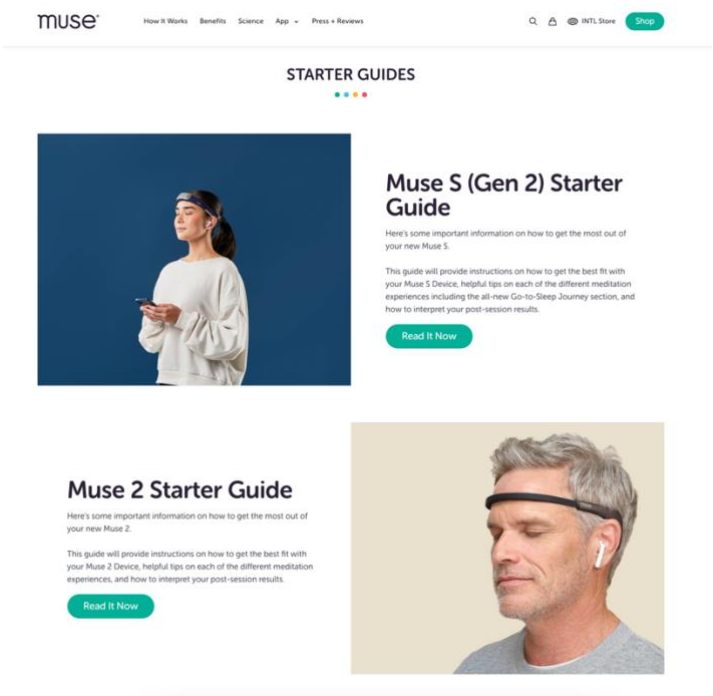

Figure 4 Muse starter guide 2023

Older people are imagined as having a slightly different problem with connection. The website blog is where older people are most represented. Muse have partnered with Rendever, a company that make virtual reality headsets for people in long term care facilities and retirement villages. The purpose of the partnership is to make meditations that play on the headsets. In the collaboration with Rendever, the problem for care that the companies purport to solve with their technologies is not too much connecting, but the effects of not enough connecting. The partnership claims specifically to address social isolation:

> "Seniors and older adults are often at higher risk for loneliness and social isolation. As a more vulnerable population, it can be harder for older adults to find pathways to feeling close & connected, especially with the heightened risks brought by the pandemic. Family and friends with older loved ones might be wondering, "so, how can we lessen the effects of loneliness and create more opportunities that increase access to supportive and longevity-fortifying social support for older adults?" … For these reasons and more, we at Muse are thrilled to partner with Rendever to explore the intersection of mindful meditation and virtual reality, and how it can facilitate social connection and wellbeing to benefit older adults and seniors." (Muse, 2023d).

There is a notable dichotomy in how connections are discussed. Older people are imagined as needing to be helped through technology to connect to others (to extend beyond the self).

In other blogs, Muse do acknowledge that younger people experience concerning rates of loneliness. This loneliness, however, is positioned slightly differently. Firstly it is positioned within as part of the 'fast paced' society phenomenon:

> "In today's world, where keeping up with social life can sometimes feel like a rollercoaster…" (Muse, 2024b)

Further, the primary purpose of the Muse for the younger user is to help to connect to the self as a way of recovering from being too connected. Where older people *lack* connections, the younger idealised user simply needs to care for the connections they intrinsically already have.

The connections of older people, in this kind of technological marketing as well as government literature, are constructed as a site of concern. Older people are imagined as a group of people who are at risk of not being connected. Older people who are not connected are stigmatised, excluded, and have an economic cost. In this way, the connections of older people are positioned as a social problem. Technologies are positioned as the logical solution to this

problem by affording the ability to connect socially. This positioning of connection influences how digitally mediated care functions for older people. It makes digitally connecting a commonsense, logical care practice. The risks of being unconnected can be avoided through individualised, technologized responses. This can shape how older people and their close networks approach connection. Myriad other solutions grounded in community or public initiatives that could connect older people are foreclosed.

5.4 Being connected takes a lot of work

Being connected is positioned as deeply important, but it is not straightforward. Digitally mediated care required time and effort on the part of participants. The alignments of people and digital technologies that produced connection as care could be hard to achieve and impermanent. It was evident that, for participants, integrating technologies and keeping them functioning in ways that enabled the types of connection necessary for care was not straightforward. It is not that the interview participants lacked capacity. The participants all used digital technologies in creative, skilful ways. Technological advertising makes setting up and using various digital technologies look easy and straightforward. In practice, this was not the case. Users, individual devices, individual platforms, and internet or cellular networks must be aligned for connection to take place[5]. Achieving this alignment is never entirely under the control of any individual. As a way of illustrating the difficulties and frustrations of aligning a network to establish a connection, I will use one story from participant Geraldine. Moving between different participants would show how the impermanence of connection as care goes beyond one participant's evaluation of their situation. However, I have chosen to focus on just one participant to emphasise the myriad different practices necessary for one person to maintain a connection and, more broadly, connectedness.

Connection as care requires many different actor-networks to be aligned. When a connection between devices is impeded, connection as care is impeded too. Geraldine, generally, could be described as a connected older person. She uses a smartphone, iPad, and laptop. As a user of these devices, she is 'mostly self-taught'. She has also undertaken courses at a local night school and with a charitable provider of ICT lessons for older people. Geraldine lives with her husband in a retirement village. She has one son that lives locally with his family, and one son

[5] For the purposes of this analysis, these latter actors will be referred to as actor-networks given the sheer number of actors mediating one another and the difficulty of mapping the connections between them.

that lives with his family overseas. She has a volunteer role with a local advocacy organisation. Geraldine also has a sister who lives locally that is a particularly important connection for her. She and her sister generally would meet face to face, but since COVID they had been using text messages and calls more. Overall, Geraldine really values being able to maintain family connections through her technology use, but she described a frustrating experience maintaining this sociotechnical network.

The example she offers highlights the complexity of the network that needs to be aligned for care to be achieved. When I met with Geraldine, she explained that she had recently purchased a new smartphone. The rationale for purchasing the phone was that the cellular network service she was with was not good:

> "I'd been with Vodafone for a long time and the reception here is shocking … And so um I wasn't getting texts. I mean my sister would send me a text from up the top of the hill or something, you know, and it wouldn't come. I'd be trying to send texts myself and they'd come back fail."

She goes on:

> "that really annoyed me. Because I wanted them to go, you know. And I had a reason for them to go. And for them to come back twice!"

The problem in this instance was Vodafone, which did not have good coverage in the suburb in which Geraldine lived. This was affectively frustrating. As has been discussed, the maintenance of frequent, casual communication is important for wellbeing and connection as care. Texting was a communication form that Geraldine expected to be easy because it had been in the past.

Purchasing a new device, in and of itself, is not necessarily a simple task. There are barriers including cost, knowledge about which device is best for particular needs, and getting to an appropriate store. Geraldine's attempt to work around her problem with connection was to purchase a new phone with a different provider. Contributing to this decision, the phone she had was not compatible with the COVID tracing app. In order to purchase the phone, Geraldine went to Spark (an alternate telecommunications provider). She describes her experience there:

> "And so I set myself a budget and off I went to Spark. And I walked in and of course he showed me all the flash ones. And I said 'no that's way above my budget'. And so we got down and down until I said 'oh yes those two are within my budget' you see.

So that was alright. And I said oh that looks quite a good one … So off we went to his um computer. Oh the price changed overnight! Oh. It was, instead of $99 it was $169 I said hang on that's labelled over there at $99. You've gotta sell it and he absolutely refused … So I thought I'm not having a big argument here. So I just said to him 'right, well its above my budget' I said. And he said 'well we all have budgets'. And I said 'yes, but some of us stick to them!'"

The incident was off putting and resulted in Geraldine taking a trip to another store. Once she had purchased the phone for the price she wanted to pay, she found that she needed to return to Spark to get a number on the phone. This was another unpleasant experience for Geraldine, as she felt rushed and like a nuisance when asking the salesperson to slow down his explanations. The example illustrates the different negotiations that go into buying a device, balancing decisions related to price and capacity. Connection as care fundamentally requires money, time, and skill.

Once a device has been purchased, it needs to be integrated into the participant's existing sociotechnical care network. This is another factor that can impact whether and how connection functions as care. Many devices have a number of different functionalities. The setup process involves multiple steps and can be quite involved. Some of the participants had new devices that were not yet being used or being used fully. The reasons for this included waiting for adult children to visit to set the device up, making the decision to get the device with someone else and not yet being sure about the new device, or being gifted the device but ambivalent or unsure about how to use it. For Geraldine, she had been using her new smart phone for some tasks (such as calling) but it had yet to be fully integrated into her routines. She explained the further actions that needed to be taken:

"What I've gotta suss out is how to get the internet on it. Um because, it's a wonder it's not doing it this morning! Because yesterday I went to the library and it was going ping ping ping … and I knew it was bringing things to my iPad because obviously I didn't have my iPad with me, did I. But I didn't have my iPad there. So I'm going to have to get this, I'll have to get some help

Interviewer: and who do you think you will go to get some help, do you think?

G: um probably the library"

Digital skills are not static. Geraldine must possess new knowledge in order to operate the new phone. The new device works in different ways to the previous one. Several different practices

have to be re-learnt for the new device. A particularly interesting aspect of the network enabling connection for Geraldine is that for connection from home to occur, a significant amount of time needed to be spent outside of the home, visiting different stores and the library. For older people with limited mobility or limited support, this kind of 'work' for connection may simply not be possible.

Digitally mediated connections as care are fragile and require significant investment to maintain. Digital inclusion, as a vision articulated by the government does recognise (to some extent) that there are infrastructural components to inclusion. Several corporate and charitable stakeholders (including advocacy groups for 'at risk' groups such as older people and people with disabilities) have called on the government to expand upon their role and do more to strengthen infrastructures and offer support for the newly connected (internetNZ, 2020). Geraldine's story ultimately highlights the many different practices that go into establishing and maintaining connections over time. Being connected is not an individual state (Fernández-Ardèvol et al., 2019). Geraldine's connections are dependent on cellular networks and infrastructural actor-networks. A person's capacity to use digital technology is distributed: produced in the interactions between bodies, environments, and devices, as well as cables, cellular towers, and other infrastructures of connectivity (Mansvelt et al., 2020; Richardson & Bissell, 2019). Specifically, connectivity involves having connections (in this case to the library) that can be leveraged to continually update reconfigure these network arrangements to make new devices work. Digital connections are understood as critically important for well-being, both in the participants stories and government documents. The fragility of connection as care is a notable, concerning dynamic in how digitally mediated care functions.

5.5 New connections, new labours

Two outcomes for care resulting from digitally mediated connections were highlighted at the beginning of this chapter: emotional wellbeing and practical support. One of the effects of establishing and maintaining these connections, as discussed in the previous section, is that participants needed to devote significant time and effort to these connections. The effort participants put into being connected benefits family members who have endeavoured to establish connective practices. It benefits the state insofar as connected older people are understood as less 'costly' older people. The process of establishing connections also benefit

technology companies who develop solutions related to older people's connections. Decisions made by technology companies offering products that promise connections shape the experience of ageing and how digitally mediated care functions, or could function. Digital connections for care can involve new labour on the self, where older people engage in behaviours congruent with roles that have been created by these different actors (and that can be of economic benefit to them). This section explores a novel platform used by one participant for generating connections to support him with practical tasks, Help X.

A vital function of digital technologies in sociotechnical care networks was to connect participants with people who could provide practical help and support. These kinds of connections involved things like putting a message in a family group chat to request help with a physical task such as lifting a heavy item, to using Google to search for and contact a professional to undertake a task. An innovative example was how participant Ian used Help X to get practical support around the house (often from young people travelling) in exchange for offering temporary accommodation. Help X works by matching people who need help with some aspect of their lives – cooking, cleaning, gardening, other jobs around the home, or childcare, with people who exchange this support for food and for accommodation (hereafter referred to as Helpers). Ian lives in a rural town. He uses the website to get help with things like gardening (particularly planting natives around his area), cooking, and big household jobs like chopping firewood. The kinds of things he gets help with are not things that he could get government support with, they are things he needs to do or arrange for himself. The website is a place where he can make these connections to get this kind of practical help. Ian has had many, mostly young, people from all around the world stay with him in this way. Not only are Ian's practical needs being met through the connections made via the platform, but he really values meeting young people from different cultures. That is not to say that the platform simply enables connection. It is a mediator that channels connections in particular ways.

Help X began by functioning like a classifieds section of a newspaper, allowing Helpers the ability to sort through listings of potential homestays and then use listed information to contact them using email/phone. The platform infrastructure (Srnicek, 2017) has developed over the years to now offer in-website messaging as well as a user generated ratings system. These features, as well as other factors such as how the interface is designed (Stanfill, 2015), shape how people engage with the site and influence the types of connections (and thus care) that result. The image below (Figure 3) is a screenshot of the interface that potential Helpers

encounter when they are looking for homestay options. At the top of the page there are a series of drop-down filter menus that enable Helpers to define their search parameters across a range of options: country, region, type of accommodation (homestay, farm stay, boat, and so on), facilities, with/without photos. In the figure below I have set the geographical region and left all other parameters at default. Below this, the profiles of those seeking Helpers display as a grid of images, with brief details about the accommodation and a series of stars that represent reviews.

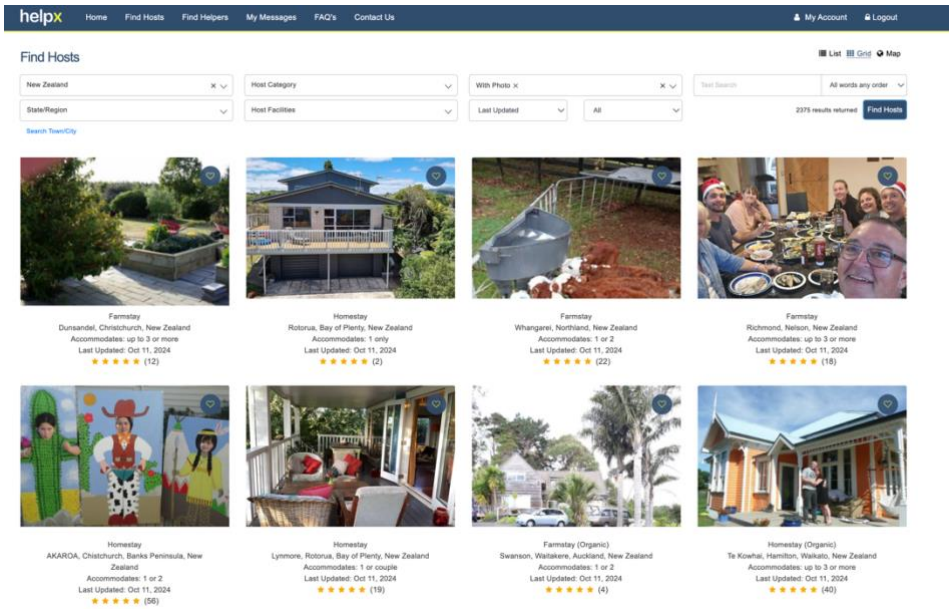

Figure 5 Help X interface.
Geographic region set to Aotearoa New Zealand.
All other options left as default

The way the search aspect of the website functions encourages those who are seeking Helpers to behave in particular ways. Of note is that there are two options in the drop-down menu for ordering the list of support seekers in any given region/offering any given type of experience. By default, the support seekers that show up in the search first are those that are most active. Those most willing and able to respond quickly to messages within the website and/or that keep going into their profile and adding new things or changing them are privileged. A potential Helper would need to manually select 'joined date' from this dropdown menu to alter this, reflecting an assumption on the part of Help X that frequent activity would be most valued by helpers. The default display is set as a grid, which privileges the image as the primary source

of information. Ian explains that because many helpers don't have English as their first language, the images are very important.

These two decisions made by Help X about how to arrange the interface compel action on the part of Ian. To make himself appear higher in the default search, Ian needs to frequently be active on the site and respond to messages. He also needs to have an image that invites the potential helper to click. To create such an image requires access to a digital camera or smartphone as well as something worth photographing. When a Helper clicks through onto a support seeker's profile page, there is information about location as well as practical information about the host. References are available in the bottom half of the page. For Helpers with free accounts, only the first line will display (premier accounts at time of writing cost 20 euro for two years).

There is a rating system for the support seekers, involving stars. While there is also a ratings system for the Helpers, Ian notes this is less useful as New Zealanders simply do not write bad things about people. He would never write something bad about a helper because then they might write something bad about him. The desire to avoid bad reviews compels Ian not to be honest. More broadly, the ratings system compels Ian into be concerned with the experience of the Helper. Ian has a particular strategy to get noticed and to give the users a fun and unique experience. He notes that what has worked really well is leaning into an interest an earlier Helper had. He has created a whole experience around this interest. When he was fitter, Ian would undertake activities with them. Providing this experience and spending time with the helpers is something that Ian enjoys. He has formed connections that have enabled him to get practical help. He's proud of having been able to use the helpers to undertake important work planting trees that benefits the whole community and the local ecology. While not all the connections have been enduring, the connections that Ian has made have been beneficial and have deeply contributed to his well-being.

At the same time, for care to be achieved in this context, new forms of labour are required (Burston et al., 2010). Ian has significant resources he is able to invest in order to be able to present himself in a way that gives him the best chance of receiving the support he needs using a platform like this. He has the economic and the cultural capital to offer fun experiences and day trips. Not everyone is able to perform this kind of labour to make their profile engaging.

People with less time or with less IT proficiency may find the need to create an engaging profile, update it, and maintain activeness untenable. Ian has something tangible and original to offer potential helpers. He lives in an appealing environment and can provide people with comfortable accommodation. Those who do not have such comfortable and fun offerings may not be rated as highly, further impacting on their ability to generate the connections they need. Ian's experience of making himself look attractive to potential helpers and being concerned with 'good ratings' demonstrates that the trend toward a commodification of the self insofar as he has to turn himself into an attractive option in a market type setting. The example evidences the "extension of promotional and branding practices into all realms of experience" which Hearn identifies as an intrinsic part of networked, digital cultures (Hearn, 2008, pp. 209-210). Finally, that Help X has power in shaping how people make connections is significant. The company exists to serve a need, and in this instance does not on sell data to third parties. Yet the functionality of the site, the way it privileges active users, is of benefit to the website itself. The more active users are on the site, the more there is potential for users to convert to premium memberships.

An implication of an increasing focus on the social connections and digital inclusion of older people is that older people will be increasingly expected to use technological means such as digital platforms to generate the connections necessary for practical and affective care. While in this example Help X is an option that works for Ian, digital platforms introduce new dynamics to sociotechnical care networks. The ratings systems that digital platforms employ have a disciplinary function, encouraging people to conduct themselves in particular ways to ensure good reviews (Chan, 2019). The need to do well on the site to succeed forces Ian to be continually attuned to the experiences of those who stay with him. The site encourages him to emphasise particular parts of his identity, the parts most likely to be attractive to younger people. In these ways, his experience of ageing is shaped in ways that align with the preferences of younger people and a technological corporation. Digital platforms are complex actor networks. Their constituent economic, social, and technological dynamics influence how digitally mediated care functions for older people.

5.6 Facebook as an OPP

The interview data made evident that Facebook was a significant actor-network that shaped how connections as care could be realised. As a platform for communication, Facebook has enormous impact upon connective practices, particularly with regard to older people's community participation. Participating in communities is both a meaningful practice that contributes to well-being and a marker of adequate care for the active, socially connected self. All of the study participants had strongly held views related to Facebook. Either they spent time discussing the complexities of using the site to generate social connectedness or they offered a strong justification for why they did not use the site. Three participants expressed directly that being on Facebook was a core part of their membership in particular communities. Not having a Facebook account would have significantly hindered their ability to be a part of the community. For one participant, deactivating Facebook had also meant leaving a group he was associated with. Other participants had a less extreme version of this, where not being on Facebook would have made participation in communities linked to family, profession, and general interests harder.

The example I will use to highlight this comes an interaction between Mary and John, a married couple in their late 70s, who were interviewed together. When I ask Mary if she uses social media, we had the following exchange:

> "Mary: I don't use any of those things whatsoever…. Don't trust any. He started with Facebook when he went to (location redacted). And he had to be part of it then.
> John: Yeah. And also, there are some of these things, like [local grocery chain] a few years ago had a competition you could only join if you were on Facebook …
> Mary: I refuse to have anything to do with it. I don't know, if he wasn't around I suppose I might be forced to do something … I just think it is a bit too intrusive."

Mary makes it clear here that she considers social media too intrusive and outside of her own communicative preferences. John, however, needed to join Facebook as part of his membership in a particular community. While no longer a part of this community, he has maintained his presence on the platform. In terms of being active and connected, Facebook is an incredibly significant actor. It is difficult to leave Facebook, because to leave means ultimately missing out on social opportunities (van Dijck, 2013).

While there is technically[6] no compulsion to participate in Facebook, it occupies a central network position in everyday life. This is expressed in Mary's comment that if John was not around to maintain an account, she may herself be forced to engage with the platform to participate in aspects of social life to which her relationship with John presently give her access. As John discovered, once on the site, it also serves as a link to other aspects of community (in this case, local entities such as providers of services and products). To that end, Facebook is an Obligatory Passage Point (OPP), an actor that *must* be involved to generate particular kinds of social connectedness. Decisions about how to arrange sociotechnical care networks fundamentally involved positioning oneself with regard to Facebook.

The importance of Facebook in shaping community was evidenced in two further ways in in the research data. Firstly, those who did not use the site spent time justifying why, generally with recourse to either a concern about the quality of the connection the platform facilitates or a broader political resistance (to its data gathering practices or the perceived electoral politics of its founder). Hilary expressed this perspective:

> "I was on Facebook a lot. Um. I've been through this whole election thing. I'm so mad at Zuckerberg and his attitude and stuff. I haven't gone off Facebook completely but, um, I don't sit on it like I used to."

Hilary does maintain a presence on Facebook to have occasional access to groups connected with her profession and neighbourhood (where things such as security measures and community events are discussed). As a result of Hilary's concerns about the site, it no longer is a website she visits for leisure. As an older person, to be a non-user without justification is risky. It may suggest that the older person is isolated from the broader community activity that takes place there or is not equipped with digital literacy.

Secondly (and relatedly), various entities providing digital skills to older people in Aotearoa offer free Facebook classes to those over 65. There is a networked effect at play. The more people that use Facebook, the more attractive it becomes as a community space to potential new users (Srnicek, 2017). It has become a space where everyday life increasingly takes place for older people. Opting out of Facebook is opting out of community life. This makes it harder

[6] In the sense that it is possible not to have an account with Facebook. Insofar as Meta's indiscriminate data collection practices do collect information about those that are not users of the platform, being completely untouched by Meta's network is, technically, not guaranteed.

for older people, whose connections are already a site of concern, to withdraw from this space without thought and consideration.

Facebook is not a neutral connector. The platform does not simply technologize pre-existing social relationships – it changes how friendship, community and interests are understood (Hallinan, 2021). For the participants, Facebook changed what it meant to be an active, socially connected older person through friendship and community interaction. This community participation could be deeply empowering. For example, Tina felt limited in how often she could go out due to her responsibilities. Her brother Jim, who has an intellectual disability, lives with her and she is his main carer. She explains:

> "A lot of my friends I'm in contact with are on Facebook. Currently I've got a girlfriend who is just getting over major surgery. So we are connecting on things a lot. Or I'll text her. Yeah. And myself I limit life a wee bit. Because I can't get, I have to make sure Jim is covered before I get out and do things"

Health issues and care responsibilities have changed the nature of Tina's relationship with her friend. Instead of in-person meet ups, their friendship now takes place over Facebook. They comment on each other's posts and text each other.

Using the groups feature of Facebook enabled Tina to further connect with interest-based communities. Facebook is image based, and she particularly likes looking at gardening pictures and pet pictures. She is currently also really interested in ancestry:

> "I'm in a super sleuths group and they helped me find some people that were buried and all their kids yesterday. They did it all within half an hour, which boggled me!"

Her participation in these communities was deeply meaningful for Tina. It was something she really enjoyed. There was a reciprocal element to the groups. People helped her and she helped other people. People she meets in online groups would sometimes become friends. This example highlights that what it means to be a connected person that participates in their community is altered by Facebook.

New complexities with regard to community participation were introduced by Facebook for participants. The collapsing of different social and community contexts into one space (the Facebook newsfeed) meant that participants saw parts of others' lives that made them uncomfortable. This context collapse (Marwick & boyd, 2011) presented new relational

challenges that had to be dealt with. Corrina's experience exemplifies this. For Corrina, the 'suggested friends' function collapsed boundaries between different communities in a way that was frustrating:

> "I changed from a previous Facebook persona to another one. Because there were some people who got onto my friends list from friends of friends. And I didn't like them. So say, I just can't stand the conspiracy theorists. What I did was I just, it is still going but I don't use it. I just set myself up with a new one. I went to people and said 'I have changed my persona, this is my new one. Please add me'. And so I have now got it, and I've tightened up my membership … So that all I have got now are people I have worked with, people I went to school with, no one else."

There are two problems here. Corrina mentioned she had had a breakdown in family relations. On top of that, some of the people that had 'got onto' her friends list (presumably she inadvertently had added them) were into conspiracy theories which she did not like. In the latter example, Facebook automatically generated connections that were experienced as *unwanted* connections. Facebook's status as commercial entity influences this experience.

Facebook does not just connect users to other individual users (or purveyors of goods or services that a user might wish to connect to). Facebook connects users and third-party advertisers, as a way of generating profit. The functioning of the platform has been carefully designed to encourage users to engage in ways that will generate the richest data (McCormack, 2019). Corrina saw lists of 'suggested friends' because having more information about people's social networks is of economic value to Facebook. Connecting users and tracking the connections being made is a deliberate commercial strategy. This inflects how the technology works, and the forms of care and community that arise from these sociotechnical networks. Facebook's status as an OPP matters for older people. New ways of being active in communities can be empowering. However, as Corrina's example of needing to create a new account suggests, the ways that community is materialised through Facebook can also present new challenges. When Facebook (or any other corporate social media platform that might proceed it) is positioned as a dominant space for community participation, other ways of being in community and achieving well-being through meaningful participation can be foreclosed.

5.7 Conclusion

This chapter has emphasised the central role that connection plays in digitally mediated care. When the different ways that connection is understood and enacted in sociotechnical care networks are analysed together, the links, conflations, tensions, and contradictions between the different meanings are evident. Being socially connected is positioned as necessary for the health and well-being of older people. Social connectedness is not just important insofar as the maintenance of close relationships offer affective and emotional support. Social connectedness is necessary to practically sustain ageing in place. It is through social connections that the need for practical support with different activities can be realised as 'informal' care rather than through formal, government funded forms of care and support. Conversely, being socially unconnected is presented as aberrant – as unhealthy, risky, and costly. The social form of connection is closely linked to technical connectivity.

Establishing connectivity (in the technical sense, by supporting older people to use digital devices) is seen as an important way that connection (in the social sense) can be engendered. Setting older people up with technologies is a care intervention that occurs at multiple sites. Key actor-networks that shape how sociotechnical care networks function to connect older people are technologies, families, and the state. Specific technologies, such as the Muse headband discussed here, position themselves as being able to improve social connectedness and, as such, health outcomes for older people. Ensuring that older people are connected technically and digitally included is positioned by the state as a way to realise independence in a broader sense. Digital connections are desirable because they enable the older person to meet their needs (or have their needs met) with the least possible state-intervention in the form of formal home support. Connection as care displaces the responsibility for older people's wellbeing to the older person and those to whom they are socially connected (often, their family). Within families, encouraging older people to use technologies and to adopt a schedule of frequent engagement with technologies is a way that this responsibility to care for an ageing parent can be realised, often by adult children. Technological corporations can be further delineated as an important actor. The commercial imperative of owners like Meta leads to particular kinds of technologies with particular kinds of functioning being widely available tools that are accessible to families. Frequent engagement with technologies and the establishment of ambient co-presence is of particular benefit to adult children, states, and the technology corporation.

The effects of digitally mediated connections as care for older people were complex and ambiguous. Technical connectivity does not realise social connectedness in a straightforward way. How connection as care unfolds is shaped by the kinds of technical connectivity that is possible as well as the actions of the key actors discussed above. For the participants, being connected socially and technically did generate a distinct form of connection as care. This digitally mediated connection as care can be a source of immense pleasure and contribute to well-being for older people. Digital technologies were also a vital part of networks that enabled more practical forms of support, as the discussions of careful surveillance and use of the Help X platform make clear. Maintaining connectedness took significant effort on the part of participants, from the work of negotiating within care dyads to new forms of labour to succeed on commercial platforms used for care. Older people are compelled through technical and familial arrangements to connect in particular ways. This involves negotiating OPPs such as Facebook, adapting to others' preferred forms of connection for connections, and maintaining schedules of frequent engagement with technologies. Ultimately, for the older people interviewed, undertaking the work on the self to be connection ready, in the social and technical senses, functioned as a marker of good citizenship. It is a sign that a person is adequately meeting their obligations to their family (making care as easy possible for them) and as a citizen (by striving to maintain their independence). The next chapter builds upon this latter point to develop the discussion of connections and individualised responsibility, exploring the theme of dependence and independence.

6. In/dependence as a sociotechnical care network builder

A core dynamic of the functioning of digitally mediated care is a tension between independence and dependence. Independence, for the study participants, was as an important marker of self-care and a key sociotechnical care network builder. It shaped how participants related to and used digital technologies, how they understood well-being, and the types of digital care practices they engaged in. Independence was largely understood and discussed by participants across two domains.

Firstly, independence was associated with self-care; being able to undertake the activities of daily living (such as personal grooming and hygiene, food preparation, cleaning, shopping, and socialisation) with either no or a context-specific minimal level of assistance from other people. Secondly, independence was associated with remaining in the private home. 'Private home' had variable meanings across participants encompassing residences owned by participants, properties rented by participants, villas owned by the participant within residential aged care communities, or villas rented by the participant within residential aged care communities. For all participants the private home was distinct from nursing home care within residential aged care communities.

When digitally mediated care functioned well for older people, this independence was enacted. Dependencies on other people for care and on broader infrastructures (including technologies themselves) were backgrounded. This chapter presents analysis based on network mapping and thematic analysis. Individual participants' sociotechnical care networks are linked to interconnected infrastructures of care and consumption. I demonstrate that for connected older citizens, achieving independence involves having the skills to successfully manage connections between the self, the home, other people, and commercial institutions.

6.1 Meeting needs without visible help

Meeting day-to-day needs for health and well-being without the visible help of another person was highly valued by all the study participants. It was one key reason that participants chose to use different digital technologies. A sense of independence resulted from participants being able to stabilise networks (López-Gómez, 2015); to successfully translate them so that the

effect of ‘self’-care was generated. Enrolled in this manner, digital technology served a function that maintained a person’s ability to carry out a particular task safely without obvious assistance. When this happens, care is achieved. The participant’s well-being plus social role as an independent and capable person were maintained.

This can be illustrated with an example from Trevor regarding his use of online grocery shopping. For context, at the time of the interview Aotearoa New Zealand had COVID circulating in the community in isolated outbreaks. Older people were advised to take a greater degree of caution in public than the general population. The vaccine was not widely available. Trevor explained why he liked online shopping:

> “Because of COVID, we very rarely go to the supermarket. Even though we have been down in, oh except for this last month, in [COVID alert setting] level one. We very rarely go to the supermarket because we don’t know who has COVID or who hasn’t. Because nobody walks around with ‘I’ve got COVID’ or ‘I’ve been to Auckland’ on their forehead! Um so. We keep our, we are very choosy where we go. Because I am an at risk [person]. A) because of my age group and B) because of my health. My wife is likewise.”

Trevor and his wife did receive assistance with some activities of daily living, but grocery shopping was something that pre-COVID they would do themselves at the supermarket. COVID disrupted this routine. Doing the grocery shopping themselves was made significantly more complex as exposure to the virus could have serious implications for them as older people with health conditions. The quote highlights that online shopping made it possible for the couple to limit their potential exposure to the COVID virus. In this example, technology enables an older person to protect their health and meet their basic needs ‘independently’, without the need for entering into relations that would be characterised as ‘help’.

The broader pattern in the data in this example is striking and significant as the kinds of networks that were valued were those where the network is organised so the activities of other people are not visible in the form of specific, individualised support with a task. In Trevor’s example, if online shopping was not possible during COVID, they would likely have needed to specifically arrange support from another person (such as their adult children or a friend). The supermarket website functioned as a black box. As a black box, the actor-network comprising the website is so tightly held that it is encountered only in terms of its input and

output (Latour, 1987). Trevor used the interface to select groceries and make a payment, and the groceries were delivered to him. The relations between Trevor, his wife, and the countless human (and non-human) actors and practices within this actor-network are not classed as dependencies or help but as an act of consumption.

Establishing this care network did take some work. The region Trevor lives in has two supermarket chains, and Trevor found one company's website too difficult to use. In this instance, the website could not be enrolled and did not function to contribute to Trevor's care and the marking of 'independence'. Yet once Trevor had found the grocery store that 'worked' for him, the various software involved, the internet connection, the hardware, the supermarket staff, and the physical store all became unnoticeable. For participants, it was when all the situated dependencies were unnoticeable and seamlessly aligned that they became embedded in the routine of everyday life (Clark & Lupton, 2022) and contributed to a valued sense of independent *self*-care.

Independence was impermanent. While sociotechnical networks could act in ways that enabled older people to carry out tasks themselves, this was not always consistent over time. Participants spoke of declining skills and confidence over time, as their health and abilities changed. No longer being able to do things independently was a loss for participants. In these instances, the participant was no longer able to translate other actors successfully to achieve self-care goals, resulting in a felt sense of dependence. An example from Vera is illustrative of this. Vera is in her 80s. She lives alone but has a large extended family in town that she is close to. While we are discussing paying bills, she mentions she was confident until recently. Her sense of confidence was shaken, in part, because the systems used for paying bills keeps changing. Sorting through the different bits of information on an invoice to figure out what to prioritise, what to enter and into which section of the online banking interface has also become quite difficult. The information is small and complex. Further, when she has made mistakes (such as not correctly reading an account number on a paper invoice to be paid online), it has taken a long time for the mistake to have been identified and rectified. She tells me that now she waits until a family member is visiting, so they can double check with her. As Vera explains this to me, she mentions she does keep trying to pay bills herself. However, she simply is not confident anymore. The justification that she *is* trying reveals the importance that being able to do this kind of life administration holds. Not being able to carry out these tasks is unsettling as it speaks to a larger loss of independence.

Here, the insight is not that digitising processes can erode independence. It is that the ability to 'do things for oneself' is co-constituted with networked, digital technology (Peine & Neven, 2021, p. 2846). Vera notes that her bills are delivered to her in different formats – some come in paper, and some come by email. They are all formatted differently, with the important information in different places. She must make sense of that information and enter it into her online banking website. She can no longer use a cheque to pay bills as they have been discontinued. She must use online banking or go into the bank or a post office (though her most local post office has closed). For Vera, it is entering the account number that causes the most trouble. With a different system for paying bills in place, the process may be easier for Vera. It is the particularities of this way of doing things that are hard for her. Vera is a person in need of support, that is, only in this particular context. In the past, Vera had been able to successfully translate a number of different sociotechnical actor-networks fostering a sense of independence with bill paying. However, over time her capacities have changed. For example, her eyesight is no longer as good. This change has occurred at the same time that there have been significant changes in how different services and utilities are invoiced. She now requires support from other people to carry the task out. Vera is a person who requires direct support from other people with a consumer task that she once did not.

The examples in this section so far highlight that a sense of independence is both an affect (and effect) generated by networks and a network building value that plays a role in structuring how people make decisions about how sociotechnical care networks should be organised. Trevor's example shows that sociotechnical care networks could enable a sense of being an independent, autonomous older person. However, as Vera's example highlights, sociotechnical care networks also functioned in ways that eroded a sense of independence. Independence, as a network builder, shaped how people felt about these sociotechnical care networks. Vera would have preferred to have paid her bills without the help of her family. A chain of associations which involved her family for meeting basic consumer needs was unappealing to her. The larger point here is that dependence and independence are not meanings that reside 'in' technologies or people but speak to how networks are arranged; about how sociotechnical networks function and how technologies are attributed meaning.

6.2 Ambient co-presence, careful surveillance, and situated independence

A particular way that technologies fostered a sense of independence was by altering the spatiality of sociotechnical care networks, enabling ageing in place. Digital technologies transform how the home functions making it a place where various interactions and connections are made possible (Urban, 2021). There were two dimensions to this within the interview data. Firstly, enabling a connection between the home and aspects of the community enables activities to be carried out independently from the home. Some participants had health, physical, financial, or other limitations that made going out into the community difficult which impacted on their ability to undertake different tasks 'themselves'. Bringing 'public' spaces into the 'private' home expanded these participants capacity to continue to do things to meet their basic needs themselves. For example, instead of needing to physically travel to the supermarket, the supermarket is essentially brought 'to' Trevor and his wife. The meaning of the house changes in these instances from a space of dependency to a space that contains the potential for meanings associated with independence.

Secondly (and relatedly), digital technologies enabled connections between the home and people who could intervene in the case of an emergency. This was vital for many participants for remaining in their private residences. It constitutes a form of 'careful' surveillance (Richardson et al., 2017), where being closely connected to another actor enabled independence. Vera's use of a push-button alarm and then a cell phone provide a useful illustration of the latter way that digitally mediated care can function to enable independence. The connection to actors outside the home was an important component of a sociotechnical network that generated care and independence as effects. Vera explained:

> "Actually, I had some funny turns, oh, 15 years ago. And my family said look we don't feel right with you living on your own. And I had a press button thing, for if you need it and that sort of thing".

Key actors in Vera's description of a sociotechnical network were Vera, Vera's family, the push button alarm, and (not mentioned in the excerpt) her doctor. For Vera, remaining in her home is very important. Vera's family had concerns about whether she could do so safely because of changes in her health. If Vera was to have a fall while alone, for example, she may not be able to access a phone to call for help. Finally, Vera's doctor makes judgements about her health which determine whether such an alarm can be state funded (the alarm was not financially viable without this funding).

The role of the alarm was to make a connection between the home and emergency services. It connected Vera to people that could intervene in situation such as a fall. Particularly from the perspective of Vera's family as expressed in the quote, this changes how the house functions and the meaning of the house. With the alarm, the house shifts from a place of risk and isolation to a 'safer' space. The nature of the connection was important for generating a sense of independence. The connection was a 'background' connection. Unlike the assistance she received with bill paying, the 'help' provided by the alarm was not experienced in a negative way. Vera was aware of the connection, but crucially it did not qualitatively change her sense of home and independence. The device means she could live in a space no other people lived and she remained in a space where she could control her own routine. The push-button alarm was also a crucial actor in the production of care for Vera because it enabled the maintenance of a valued way of life (and notably, in this instance, Vera's health did improve with time).

Vera's experience highlights a broader point: the creation of ambient co-presence can function as a form of careful surveillance, where being monitored contributes toward a sense of independence. This was particularly evident when she no longer qualified for a state-funded push button alarm. Vera now uses a cell phone in place of the push button alarm.
She describes this sociotechnical care network:

> "Well, I always have my cell phone by my bed, so I can um. Well, it's changed coz she's [daughter in the room] only been home a couple of months. My other daughter I could text or granddaughter I would text… I've got friends who turn [their cell phone] off at night. And I said "well you, that's when you need it"! "No one is going to ring you", they said. "I don't want to be rung at midnight". And I think, well usually if it is midnight it is something urgent! Like the granddaughter "aaaahh I've just come home and someone has burgled the house". Ring your father!"

A significant component of independence as described here is a sense of ambient co-presence between the older person, networks that can provide support to them, and networks that they provide support to. Being 'available in the background' for other people is an integral part of the functioning of networks that achieve care. It is also a kind of careful surveillance. In the quote above, there are several network dynamics and practices described. The family use text as a means of communication. This occurs in emergencies (as mentioned here) but also more broadly as part of a day-to-day communication to 'check in' with each other. Being available to and being monitored are not one way one flows – the example describes a mutual surveillant

arrangement, where different parties are using digital technologies for the purpose of 'watching' each other and being available to provide practical support to one another (Sinanan & Hjorth, 2018). The way this family care network has been set up ultimately enables the well-being of several actors. Crucially, in this arrangement Vera is not *just* a person who is in need of care. Unlike with the bill paying example, she is not the only person who needs support. Instead, Vera is person enmeshed in a network where responsibility and concern are distributed, where others also require care. Vera might require support. But she is also someone who can be called upon in an emergency for someone else (even if, as she jokingly suggested, she feels she might not be the best person to deal with things at that time). While the push button and cell phone connect to very different kinds of sociotechnical network, each ultimately enable independence for Vera.

Independence, like care, is always situated. For a sense of independence to be felt, there must be a practical fit as well as an aesthetic fit between people and technology (Pols, 2012). When digitally mediated care functioned well for older people and these fits were achieved, a sense of independence was produced. Practical fits involve the maintenance of arrangements of people and technologies that enable the background, lateral awareness of other people that can provide support. Aesthetic or affective fits involve the careful balance between closeness and distance in a way that meets the expectations of the older person. The discussion so far highlights that it is particular and specific kinds of relationships and connections between humans made possible by digital technologies that contribute to a sense of independence. Independence can be fostered when digital technologies act in a chain of associations between the older person and people outside of their social circles (here, supermarket workers and emergency service staff). Even when a sense of being 'looked after' results, it is the feeling of a *professionalised* connection (the consumption of a service) that supports independence. Paying for grocery delivery is a different kind of social relation to 'having the shopping done for you'. Similarly, Vera's cell phone network reflects that care for an older person can be realised within the family without destabilising the sense of independence if there is a particular ordering of relations. While the appearance of invisible connections and dependencies is the ideal aesthetic or affective fit, being a person in need of support can be 'excused' where there is some reciprocity between parties.

While quantitively different kinds of relationalities have been described in this chapter so far, a core component to a sense of 'independence' is that age and health status are backgrounded

as notable factors. This kind of independence is driven by value systems that prioritise 'not being a burden' and 'self-reliance'. This reflects a complex interplay between the affordances of digital technologies, family practices, connections to different services, and care. At the same time, these examples make visible the broader networks necessary for individual fits to be achieved. The next section considers this further by discussing the infrastructures that make 'independence' possible.

6.3 "I thought I had made a mistake": Global infrastructures of care

A characteristic of sociotechnical care networks that generate independence by enabling selfcare is that the *infrastructural* dependencies that make it possible are invisible. The independent self-caring individual and the private home, as a space entwined with meanings of independence, connect to many other spatial, temporal, material, and social actors. Self-care and independence are dependent on the functioning of sociotechnical infrastructures and infrastructures of care (Danholt & Langstrup, 2012). Infrastructures are the complex actor-networks that shape how other actors relate and give order to networks, defining actors and their possibilities for actions (Brunn Jensen & Morita, 2015). Infrastructures are black-boxed actor-networks, their constituent parts not generally obvious in use (Star, 1999). Infrastructures become visible only when they cease to work (Star, 1999) and prevent action. Care infrastructures builds on the notion of infrastructures to denote the materially heterogenous actor-networks that make care and self-care possible, comprised of relations between "materials, spaces, routines, conventions and work" (Weiner & Will, 2018, p. 272). Care infrastructures are densely connected actor-networks. By definition, they order and relate to many different actors (Star, 1999). At the same time, care infrastructures are emergent insofar as their network configuration is dependent on the actors they relate to (Weiner & Will, 2018).

Care infrastructures make the independent self-care of participants possible. They are at once present *and* invisible in participants descriptions of their sociotechnical care networks. As discussed, independence was valued highly by participants. As they spoke about how they engaged in self-care routines where they met their needs independently, it was evident that a number of infrastructures and care infrastructures were significant actors. While not mentioned directly, care infrastructures were visible as the associations that spanned multiple participants networks, as barriers when things did not work as expected, and as successfully translated

black-boxed actors that participants encountered (communications providers, for example). These infrastructures were invisible in the sense that they were not experienced as dependencies while at the same time the fact infrastructures could be 'glimpsed' in network descriptions given by participants indicates that the interactions within and between participants and care infrastructures were not frictionless.

An example from Mitch illustrates this point. Mitch had developed a number of different systems that allowed him to be "fiercely independent". Describing himself as *fiercely* independent connotes affective intensity. Further, fiercely expresses the intensity with which he pursues independence. Achieving independence took a significant amount of work. Mitch is in his late 70s, is 'hard of hearing' and has other health issues that limit his energy. He describes himself as 'slowing down'. His hearing condition means that he does not use the telephone. He does not have formal home help services and lives alone. His family mostly live overseas. He does not have close relationships with his family or anyone who can provide practical support from afar. Paying bills is something that could have been difficult based on his circumstances. To go into the shop would either require him to walk or to be driven by someone else (for example, someone from the retirement village community he lives in). The factors all present challenges for an affective sense of independence. It was because achieving independence was not 'effortless' for Mitch that the infrastructures that support care were (partly) visible.

Mitch's description of how he pays his bills highlights the many different care infrastructures that make independence and self-care possible for community dwelling older people. In this quote, Mitch explains the routine and systems he has for paying his bills:

> "Now that I have been paid [his superannuation] today I can go into my email, and oh here we are! Uhh, now the bills that I have to pay soon are my Spark, this month's Spark bill. $85 pay online. And you sort of, well it saves me going down to the shop to pay it or going anywhere else … [trails off][navigating to a folder] I have got another bill that needs to be paid, Grey Power electricity"

In this account, many translations are outlined. For example, Mitch has successfully enrolled his PC and translated a number of different actor networks so that bill-paying is something he can do himself. His bills are delivered to him via email. He has a folder for bills that need to be paid that he transfers the incoming bills to. Once he receives his pension, he checks the 'to

be paid' folder and pays the bill. Being able to pay bills online means he can undertake this task himself without the visible assistance of other people.

Importantly, a number of infrastructures are (partly) visible in this example. These include, but are not limited to electricity, superannuation, information and communication physical infrastructure providers (Spark), the email client, the email provider servers, and the banking interface. The example highlights the way these infrastructures relate with the effect of making a particular way of life possible for Mitch. Mitch's ability to 'do things for himself' is contingent upon these infrastructures. Without superannuation, for instance, paying for utilities would not be possible. Mitch's broader care regime is contingent upon these infrastructures – in this instance, they are care infrastructures. They make possible activities integral to Mitch's emotional and physical well-being (for example, without electricity and internet connectivity, Mitch's connection as care would be significantly impeded). Ensuring that these actors are all aligned takes work. It is in these kinds of interactions that infrastructures became visible.

Digitally mediated care networks function in valued ways when independence is an effect generated. Ultimately, this independence is based on a number of situated and contingent dependencies. Infrastructures are characterised by interactions between multiple, heterogenous actors, actor-networks and other infrastructures. While these relations were not framed by participants as dependency, they were nonetheless essential for independence, selfcare, and care. In these interactions, worlds are produced (Brunn Jensen & Morita, 2015). Infrastructures make particular ways of ageing possible. Specific forms of care and independence are made possible and impossible by infrastructures. These dependencies involve infrastructural relations between complex actor-networks of people, technologies, materials, spaces, temporalities and institutions. These relations are only partly visible in the quote from Mitch. Superannuation, as a care infrastructure, is characterised by an immense number of sociotechnical actor-networks that appear social, technical, political, and cultural. The online bills his system responds to are made possible by a muti-spatial, multi-temporal planetary network of materials, labour, policies and practices. These infrastructures need to be continually maintained – no outcome can be considered a given.

To maintain independence as a valued way of life for older people in Aotearoa New Zealand, very different kinds of maintenance activities are continually being undertaken in different

locations (Mattern, 2018; Puig de la Bellacasa, 2017). The systems that Mitch develops to continue doing things himself are supported by very different kinds of infrastructural maintenance activities. He has carefully built a network to maintain his ability to live alone, to pay his bills, and to do as much as possible without support from his retirement village community. The way that Mitch uses technology supports ageing in place and maintains his sense of self as a fiercely independent person. The device that enables Mitch to undertake selfcare is contingent upon infrastructures of resource extraction, global production and supply chains, server networks, and eWaste management inter alia. The infrastructures involve human and non-human actors in a range of locales (Wright, 2019). Careful attention to and maintenance of these infrastructures at sites all over the planet is necessary to ensure their continued functioning (Mattern, 2018). The impermanence and fragility of infrastructures becomes most visible and problematic for participants in the situations where they impede action that is necessary for achieving self-care (Danholt & Langstrup, 2012; Star, 1999).

6.4 Self-care in consumer markets

One set of infrastructures which particularly destabilised the functioning of participants sociotechnical care networks were those associated with consumer markets. Participants necessarily must meet their needs in markets, as consumers. As described in the previous section, having needs met as a consumer can be preferred to having needs meet through support from friends and family. At the same time, the infrastructures that make consumption possible and desirable are obscured when care interactions take place within market situations. Encountering goods and services in the context of markets means that situated dependencies on servers, electricity, regimes of resource extraction, labour, and political arrangements are obscured. Another set of relations (the relations of consumption) are foregrounded through visible interactions with corporations, retail workers, shop layouts, EFTPOS machines, websites, and delivery companies (Marx, 1867). These relations are affectively very important in terms of the dependence/independence tension. Because of the importance placed on independence, when the infrastructures of consumption that support it function in new ways, care can be destabilised. Independence as a social value makes sense in the social, economic, political and material networks of capitalism. Living in market economies means that support, reciprocity, and self-care are understood in commodified terms (Robertson, 1997).

Changes in the sociotechnical infrastructures of consumption could make meeting physical and psychological needs harder, destabilise participants sense of independence, and can be exclusionary. Policy and ideological constructions of ageing in place as a key marker of independence can elide the challenges older people experience building and maintaining functioning sociotechnical care networks within the infrastructures of consumption. Beth's experiences with a machine at her bank highlight this. Beth lives alone in a retirement village. None of her children or family live in her town. Until recently, she had been involved in her social club as the treasurer. In this excerpt from my interview with her she explains why she has given this up:

> "I used to bank the money for the social club. But one of the reasons I gave it up is because putting the money in those machines, this is the [Bank Name], um I've found that one of their machines is not accurate. Now twice I accepted it. I thought I had made a mistake. Because I hadn't listed how many of what I had. And then the third time it told me I was $2 short. So, I got two dollars out of my bag. Put it in and did it again. And it said I was $2 over. So I called the guy over … And he said 'oh!' he said. 'Sometimes a coin gets caught over the sensor'. But I said 'that is not good enough'."

Having a role within the social club was a way that Beth contributed to her community at the retirement village. She enjoyed administrative tasks like working with numbers. Taking on the position was a way for her to use her skills to benefit the community. Until recently, the role had contributed to Beth's psychological well-being. She enjoyed the role. It was an activity that contributed to her happiness. In this example, independence was not just about being able to meet a need for self-care, but to perform tasks that benefited an entire community. Being socially active and contributing to social groups are markers of independence that reflect socially valued ways of ageing (Asquith, 2009; Hepworth, 1995). Two significant analytic points are highlighted by the experience. Firstly, it demonstrates how infrastructures of consumption made the sense of 'independence' possible and impossible. Secondly, it adds another layer of complexity to the spatiality of independence.

The possibility for independence and for active forms of ageing is shaped within actor-networks that are arranged to achieve other priorities. Beth's independence (and a sociotechnical network that generated care for her) was destabilised within a key sociotechnical infrastructure of consumption – the bank. Beth comes into contact with infrastructures of consumption through a connection with the automated teller machine. The

bank that Beth goes to has now automated most processes, with cashiers replaced by a combination of sensors, software, and hardware. The problem here is not caused simply by the technology or act of banking. Rather, Beth's ability to meet her needs herself is curtailed by the interactions between a host of corporate, technological, and political actor-networks and infrastructures. For instance, the bank is a privately owned bank and operates in what is now a loosely regulated financial sector. In line with a neoliberal approach to policy, the banking regulation that does exist in Aotearoa New Zealand primarily is concentrated on financial products and how the money banks hold is managed. There is little in the way of legislation that guides how banks must serve the communities they are in. As such, the banks imperative to make a profit drives the business decisions it makes. The development of technologies enabling process automation and data driven decision making have shaped what are considered 'good' business practices in the broader economic environment banks operate in. In practical terms, the sum of these interactions mean that many banks have closed or operate on reduced hours. The suburban bank that Beth frequents has drastically reduced staff, providing many of their in-person services in the central city.

To be independent, older people need to be able to participate in consumption, successfully translating many consumer technologies so as to meet needs. However, the infrastructures of consumption are not organised in ways that prioritise serving the needs of older people. Not being able to successfully 'connect' to the infrastructures of consumption can be a site of exclusion: it prohibits older people from being able to meet their needs. Beth's example reflects an additional spatial dimension to 'independence' – 'independence' may take place beyond the home (Aceros et al., 2015).

The chapter so far has argued that one way that independence can be achieved is by altering the spatiality of the home so that it becomes a space where a number of activities can be achieved without the intervention of other people known to the participant. Further, it has argued that independence in the home is supported by planetary infrastructures and maintenance activities. Activities and practices that relate to care, self-care, and independence also necessarily take place outside of the home. Beth's example makes evident that technologies are encountered in the community space and these technologies alter how care networks function. It is also true, however, that technologies that support ageing in place at home at times required participants to enter the community. The most common reason for this was that devices needed to be purchased, replaced, repaired, and disposed of. Geraldine's

experience of needing to purchase a new cell phone, discussed in the previous chapter, was a good example of the way that a technology meant to support ageing in place required a significant amount of community travel.

Preferences related to how sociotechnical care networks function to a large degree are shaped by the kinds of relations made possible by the infrastructures that shape care. Infrastructure makes evident the way that care networks of participants are connected to other actor-networks at a planetary scale. As the discussion has made clear, when participants meet their needs within markets, particular kinds of relations are foregrounded (those related to consumption). This not only renders broader infrastructures invisible but also influences what kinds of care relations are desirable. Dependence and negative experiences of a destabilisation of care are associated with not being able to negotiate consumer relations. The final sections of the chapter describe the processes of gaining the skills required to be successfully independent and 'not dependent' in sociotechnical networks.

6.5 'And I thought, it's the 21st century, don't you know about backing up?'

Changes to the infrastructures of consumption ultimately shape what it means to be independent. Infrastructures are sites where different sociotechnical actor networks meet in ways that shape the possibilities for other actor networks (Brunn Jensen & Morita, 2015). In practice, this means that the skills older people require to be independent have changed. Firstly, participants needed to be able to use a range of different technologies in the home and community in specific ways to enable them to meet their needs. Some of this up-skilling took place within family and social networks. Notably, participants had also engaged with community programmes to learn new digital skills. Secondly, participants needed to have a broader set of skills connected to managing technologies if they were to be independent.

To ensure that older people can participate in consumer relations and changing infrastructures of consumption to meet day to day needs, a care infrastructure has developed. Changes to the sociotechnical infrastructures of consumption (like banking) as well as infrastructures of care more broadly (such as patient portals) have necessitated responses on the part of communities and national organisations. Voluntary, publicly funded, and public-private partnership initiatives to help ameliorate the effects of private sector decision making have been developed.

Some corporate entities do donate to these organisations and there is government funding available to support them. However, the community-members that actually deliver such sessions generally do so without compensation for their time.

Participants in this study had engaged with different kinds of programmes designed to improve their digital skills so they could 'independently' use technologies to meet different care needs. This involved attending programmes ran in local libraries, community centres, or (now closed) courses at the local college/polytechnic. These kinds of training initiatives were of some help to participants in learning how to use particular operating systems and software programmes (including the Windows operating system, Microsoft Office applications, and Facebook) as well as identifying scams. Overall, the programmes did contribute positively to a sense of independence and general confidence. However, there were notable limitations to the extent to which this could be achieved.

Participants did not just need to have the skills to be able to manage particular interfaces, operating systems, and devices to be independent. They also needed to have a larger set of skills connected to managing technologies. These included skills related to acquiring, configuring, and maintaining devices so they could be used and managing new types of risk that changing sociotechnical infrastructures presented. Digital skills programmes were less helpful in this regard. The capacity to be independent relies on competencies and skills which are distributed across many human and non-human actors (Mansvelt et al., 2020). Rather than residing in participants or particular devices, capacity arises relation to particular devices in particular situations.

For example, online banking was something that many participants used, with varying degrees of success. It is a good example of a process that has not been constant over time and involves many different types of skills. Online banking does not just require participants to be able to navigate a particular banking interface or application, many practices are involved. The process of getting started was similar across the participants. Firstly, an appropriate device was needed. A username needed to be requested. The device needed to be set up so the participant could access a browser. An application may have needed to be downloaded. A password needed to be selected. Risks specific to online activity needed to be managed such as by installing antivirus and anti-malware software. The participant then needs to learn the systems for

attending to different kinds of tasks. Layout changes need to be negotiated. Finally, there are a number of digital 'care' practices (such as browser or operating system updates) that have to be carried out on particular devices to maintain access to the banking interface. Crucially, the expectations regarding what care practices were necessary were sometimes only evident once problems occurred.

The skills required to be 'independent' can be positioned as general, expected knowledge so that when things go wrong 'blame' is individualised. An anecdote from Trevor about an acquaintance experience perfectly highlights the way the broader skills connected with device use can appear implicit:

> "One of the committee members said at the last meeting that his tablet had crashed and he'd lost everything. He'd lost photographs and all sorts of things. And I said 'did you back it up'. 'What do you mean back it up?' And I said 'onto a standalone hard drive?' 'How'd you do that?' And I thought, it's the 21st century! Don't you know about backing up? And I explained how to do it. 'Right' he said 'I'm going to have a word to my wife. We are going into town to buy us a hard drive'. And I says 'it's a bit late now you've lost it all'. I back up my data twice a week".

Trevor takes the risk of losing his data very seriously. His humorous incredulity at the other person in this anecdote's lack of knowledge suggests that Trevor feels this is simply basic knowledge. This presumed knowledge is positioned as fundamental for using any digital device, something that everyone in the '21st century', including older people, should know.

For Trevor's acquaintance, it was only when a problem occurred that he became aware that he was lacking a skill related to using his device. Backing up is a device care practice that he was not aware of. While the solution Trevor offers is not the only way that this can be done (tablet style devices can be used with cloud-based storage systems, for example), backing up is presented as an obvious step, a necessary care practice. Taking Trevor's description literally, the problem in the network is his acquaintance who he lacks the requisite knowledge. The way that Trevor chose to recount this story makes evident the social relations that lead participants in the study to place responsibility for things going wrong. Broader device management skills are not always obvious, but when they are presented as basic knowledge, not having them can be experienced as a failure of the self.

One of the consequences of the individualisation of responsibility for network failures is that participants had broad worries about possible new kinds of risks that could destabilise their independence. People were concerned about the ways that digital technologies introduced new risks into their lives. These related to 'doing the wrong thing' (as discussed above) or 'being had'. A fear of being 'had' involved concerns about identity theft, falling victim to scams, getting a virus, clicking a bad link, risks associated with social media as well as risks associated with selling or purchasing goods online. These fears did not dissipate with time and were felt as risks that had to be managed individually. For participants this showed up in the care they took to manage their online presence. For example, consider this description from Janet about how she is careful about what she posts on social media:

> "But if I am away on holiday, then I don't post. I might post something when I get home. And that is a security thing".

When she made this comment, we had not been talking about security but instead about her participation in different community groups. That the quote came up in the quite random way reflects the general sense of threat that is intwined with sociotechnical networks. Across the interview data, the many different ways that people were concerned about and managed security speaks to a broader, ontological threat for older adults meeting their needs with technologies (Carpentier Reifova & Fišerová, 2012). While independence is an outcome of sociotechnical networks, these networks also present a significant threat to one's security as a person – independence is accompanied by risk.

To be independent, the tension between care and risk as possible outcomes of sociotechnical networks needs to be continually managed. Being a digital ready citizen able to participate in a culture of connectivity requires participants to successfully translate a number of actor-networks to demonstrate competency. The responsibility to cultivate these skills and the burden of keeping safe is individualised and borne largely by older people themselves. Digital training programmes as well as the work that older people do to ensure they can function in the sociotechnical infrastructures ultimately act as a public subsidy to corporate profits: they create digital ready market citizens so that corporations can maximise their profits by reducing the face-to-face delivery of services. The sociotechnical infrastructures of consumption are actively cared for and maintained by older people as they develop into competent, digital market ready citizens that participate in cultures of connectivity.

6.6 “A lot of old people look after their bodies like a pet cat”

The chapter so far has presented independence as an important network builder. In much the same way, a desire to avoid dependence also shaped how people related to technologies and made decisions about digitally mediated care. There were two key ways that dependence was understood in the interview data. Firstly, dependence was associated with increasing frailty and declining capacity to meet needs without intervention from other people. Secondly, digital technologies themselves were also an actor that were felt to erode participants sense of independence. Dependence was understood as being too reliant on a particular device. Self-tracking devices, push-button medical emergency alarms, and social media were most associated with meanings of dependence requiring negotiation on behalf of the participants. This negotiation could include outright rejection, positioning the technology as something that was not needed now, or through management of how the technology was used or narrativized. Dependence and independence are not fixed, binary properties residing in people or technologies but emerge from these interactions and are fundamentally in tension.

The tension between a desire to be independent and increasing need for support shaped how participants engaged with devices and built and narrativized sociotechnical care networks. Mitch, who had a push button alarm, provides a good example of the way that through purposeful engagement with devices, the meaning of a particular technology could be altered. As mentioned, Mitch does have conditions that mean his chances of experiencing a fall or medical event are higher. He qualifies for a state-funded medical alert alarm. While he has the alarm, he explains he does not use it as an alarm. Mitch rejects any connotations of dependence that might be associated with the alarm and his declining health. Mitch utilises the alarm to:

> “I use it to put myself at the front of the queue down at [local free supermarket]. Because if you have health issues you go in first!”

Mitch’s use of his alarm can be understood as a process of tinkering (Mol et al., 2010). The purpose of the device is that is always worn and only pushed when needed. Mitch does not use the device in a way that entirely contradicts this. Taking the device into the community and not pushing it unless there is an emergency is it’s intended purpose. Tinkering occurs in the new use he has found for the device, as well as in his narrative about the device. The alarm arrived in Mitch’s life with a prescribed functionality and connotations of frailty. It has ultimately been funded for him because of his greater need. However, what a technology means is never fixed.

Mitch has adapted what the alarm means to suit his life and priorities. Using the device at the free supermarket generates a new benefit – he can avoid waiting in line and get the first choice of the available food. In doing so, Mitch has made a claim about what a technology means (Peine et al., 2021); re-purposing the technology to produce care for himself on his terms (Berridge, 2017).

Mitch's words reflect the kinds of usages he values related to technology as well as a larger tension between dependence and independence. He frames the way he uses the device in terms of a continuation of his 'entrepreneurial self' working to maximise his own self-interest. Mitch's only income is his pension. He does not have other financial resources to draw from. These are factors expressly recognised by Mitch that limit his independence. Mitch's use of the device is a way to address this. There is a negotiation evident between the contradictory subject positions of being dependent on state and private sector welfare and being an independent older person. In this way, his words reflect the power neoliberal ideology has in shaping how people feel about receiving care, devaluing the need for support and valuing doing things alone and being 'crafty'. Mitch and I discuss his conservative political beliefs and activity in online far right spaces extensively, so these kinds of negotiations and ideological tensions were immensely relevant in context of Mitch's life and values.

More broadly, the example highlights that dependence and independence were in tension rather than two diametrically opposed states. There is no single origin for this tension – it results from a complex association between the meanings encoded in particular technologies and the values and practices of the participants as they use technologies. Creating sociotechnical care networks that functioned well for participants necessarily involved some negotiation of this tension.

The technologies that were linked most strongly to connotations of the first sense of dependence by participants were those made decreasing health status and frailty visible outside the body. While no meaning is fixed and in other instances these devices produced a sense of independence, the push button alarm and self-tracking devices were the two technologies most discussed in this regard. There are connections between these two device types. In the interview data two participants expressly linked self-tracking devices such as fitness watches and the push button alarm. An increasing number of fitness watches incorporate a falls sensor and

emergency alarm functionality. Further, push button alarms with some of the functionalities of fitness watches are available. Many participants resisted the use of these technologies.

Corrina's objection to self-tracking devices is particularly illustrative in highlighting the dependence/independence tension and how this can become visible and resisted. Corrina doesn't engage in any self-tracking practices, and really does not want to. She explains why:

> "I feel, I think it is because a lot of old people look after their bodies like a pet cat. 'Oh, my knees playing up today. Oh, my breathing is a bit –.' They become really quite boring about it.
>
> I: focused on it?
>
> P: focused on it. And I sort of think, if you say you've got one [a tracking device], they say 'oh now lets compare it'! Shoot me now! I don't want to be in that thing. It's a bit like having a Fitbit watch. It's, let's face it. At our age we are not going to be running a 3 minute mile!"

Corrina associates self-tracking with a close observation to the body which, from her perspective, is already a preoccupation of older people. For Corrina, this has negative connotations ('boring'). The self-tracking device consistently monitors, provides information about, and encourages reflection upon the body (Lupton, 2012). Corrina notes that such close attention to the body can end up focusing excessively upon decline ('playing up knees' and 'troublesome breathing'). She draws upon a frame for understanding self-tracking where younger bodies are understood as able to be optimised and older bodies are docile, and in constant need of management and surveillance (Neff & Nafus, 2016). At the same time, Corrina articulates a resistance against some of cornerstones of self-tracking marketing. She rejects that health is endlessly optimisable and that the notion that better health will result from participating in practices of sharing and collective reflection on the body (Kent, 2018b). She resists taking part in participatory surveillance – the act of causally or socially sharing "yourself or your constructed identity" with other people (Whitson, 2013, p. 172).

Dependence is not simply about frailty or declining health, but the representation of that decline as well as how the dependence/independence tension is negotiated with technologies.
In the following excerpt, Corrina describes a friend's use of a push button alarm:

> "I have one friend who has [an] alarm. She couldn't exist without that now. Even though she has now moved into a retirement village. But it has become a talisman. It is her safeguard, safety thing"

From Corrina's perspective, her friend no longer needs the alarm now that she has moved into a retirement village. The village is a space where some of the risks of living in the community have theoretically been lessened. The device is no longer actually contributing to the friend's safety. It is instead being treated like a magical object with some special power ('talisman') to protect her friend. Corrina's friend has a sociotechnical care network that is surplus to her requirements. Independence and dependence (again, in Corrina's understanding) have not been balanced in the care network she describes. Each of the examples given by Corrina highlights that dependence is produced by technologies *and* particular ways of using them. In this way, the example also reflects the second meaning of dependence. Being too dependent on technologies was widely considered undesirable in the interview data, and it was something participants actively strove to avoid.

The tension between independence and dependence was also described in ways akin to a continuum, where uses of technology that fostered a sense of independence were valued and contrasted with uses of technologies which reflected dependence were devalued. This sense of dependence differs from the first meaning of dependence in that it is not specifically linked with older age and frailty. It is nonetheless similar insofar as it was linked with the loss of an ability to do things for yourself. Here, it is not a reliance on other people that is felt as a problem, but a reliance on a device. This quote from Tina very clearly represents this position and concern:

> "Yea I have this [waves cell phone]. It's an aid to life. I don't want technology to run life! A lot of young people, I have a perception, run their lives through those. Whereas these are meant to be an adjunct to help us connect. You see young people wandering around with these things. No thank you. I'm probably on it more than other people but no. I don't want things to take over my life."

There are a number of significant sociotechnical network dynamics mentioned in this example. First, Tina quite clearly expresses an intended purpose for the cell phone she has: connection. As has been discussed in the previous analysis chapter, the power that connection has in building sociotechnical care networks is evident. Second, she articulates that a concern for her is that technology could erode her autonomy. Letting technology 'run your life' is positioned

as problematic. Third, she identifies a particular group whose behaviour is of concern: younger people. Finally, she makes a comparison between her use of her cell phone and that of other people.

This kind of dependent usage, as expressed by the participants, represented a lack of personal ability and sense of agency. The language used to describe these kinds of relations strongly indicated this: technology could be something people 'depended' on, it 'took over', 'ran their life', and was something they 'couldn't exist without'. In these instances, too much has been delegated to technology or a user is unable to function without technology. Analytically, agency (and the sense of agency) is a product of network interactions. The capacity of participants to act and make decisions is realised across sociotechnical network interactions, produced in the relations between actors. As has been described, uses of technology that make meeting needs without requiring assistance from another person within the social circle and facilitate living in the private residence were highly valued. From the perspective of participants, when self-care functioned well, the networks of dependency that underpinned this were obscured. Further, in self-care networks that achieved independence as a goal, technology had been successfully translated: it functioned in service of a goal by participants. Technology became most visible and remarkable when it impeded this goal. Dependence on technology functioned in a similar way insofar as it became visible only in certain circumstances. The capacity to 'do things oneself' always emerges from the relations between human and non-human actors inside and outside the body. When technology use did not fade into the background, and these relations were evident, it could become framed as dependence.

There was a notable generational element to digital dependence. These network dynamics were most frequently (but not exclusively) evident in the data as anecdotes about the way that other, often younger, people used technology. Younger people, as has been described so far, have an important role in shaping sociotechnical care networks and setting expectations that structure how older people relate to devices. Within families, for instance, younger adults played an instrumental role in older people's technology acquisition and usage. A resistance to digital dependency can be understood as an act of resistance to sociotechnical networks that have been set up in tension with the priorities of the older person, as well as to broader cultural actors that devalue age and older people's use of technology. However, over-reliance on technology was ultimately understood as a lack of control that could also impact older people. Tina's comment situates her own use in relation to other people, identifying that she probably does spend more

time online than other people. Other participants did understand themselves as becoming too dependent (and self-care strategies to avoid spending too much time online are discussed in the next chapter). Fears about a lack of autonomy and ability to do things independently are felt particularly acutely by older people given the associations made between age and a decline in these capacities. As such, a perceived dependence on devices can signify a much broader threat to independence.

6.7 Conclusion

Independence has long been a marker of appropriate citizenship for older people. Charting the different ways sociotechnical care networks produce dependence and independence illuminates what 'appropriate citizenship' looks like in a culture of connectivity. The experiences of the participants detailed here describe how the desire for independence (the appearance of doing things oneself) shapes how digitally mediated care functions. Valuing independence, at the personal and policy levels, leads to particular ways of using technologies to achieve care. At the same time, what it means to be independent as an older person is altered as engaging with digital technologies is increasingly a necessary part of daily life. Achieving independence involves negotiating many situated dependencies with digital technology so that a sense of 'doing things yourself' can be maintained. This involves establishing connections between multiple material and semiotic actor-networks. Each of these actor-networks reflect densely connected, planetary networks that vastly exceed participants network building. To function, they are dependent on significant amounts of labour and resources. Because these dependencies are mediated by corporate, state, and technological institutions, they are not experienced as being dependent by participants. Dependency is instead marked by specific kinds of relationships between people and technologies characterised as visibly needing help or being too reliant on a device. Notably, good versions of digitally mediated care are constructed and reinforced through watching how other people use technology. A core component of citizenship for older people living in a culture of connectivity is the ability to successfully manage connections to avoid these kinds of obvious dependencies. Failure or inability to manage connections is deeply consequential. It can destabilise a sense of independence, and even more seriously, be a site of exclusion.

7. Digitally empowered patients?

One of the promises often associated with digitally mediated care is *empowerment*. In a broad and general sense, the word 'empower' denotes enabling an individual or group to do something. The contemporary usages and meanings of empowerment are often linked with 1960s struggles for racial, gender, and other forms of equality. The term encapsulated a desire for a complete reorganisation of social, political and economic power (Schutz, 2019). Since then, empowerment has become a widely used term. As it is currently used, empowerment has a less radical meaning linked to the ability of an individual or group to 'take control' of an aspect of life (Baistow, 1994). When the term is used in contemporary discourse relating to older people, it often describes something that can be done to older people. Empowering older people is a goal of neoliberal policy related to ageing (Katz, 2005), and of the health and welfare professionals that work with older people (Baistow, 1994). In the lexicon of these groups, mastery over one's life is central to the meaning of empowerment. Further, empowerment is closely linked in these understandings with connections. According to Van Regenmortel and De Witte (2023, pp. 21-22)

> "People gain strength and grow through connections with others and their surroundings (informal and formal social supporting ties) and, inversely, strength results in increased connectedness".

Visions of empowered older people involve being connected, managing those connections appropriately, and as a result, gaining control over one's life.

Technology is imagined as a tool that can help realise empowerment. Digital technologies are imagined to empower users to connect with others, make changes in their lives, live life more fully, and be more confident (Lupton, 2017). One of the most pervasive visions of technologically enabled empowerment is in the health sector. New technologies are heralded as being able to offer increasingly personalised precision medicine, where the ability of digital technologies to collect and make sense of large amounts of information will lead to specific and targeted medical advice for patients (Prainsack, 2018a). Through individualised (rather than generic and de-personalised) care patients are empowered with the tools to manage their bodies. The empowered patient in idealised digitally mediated care networks is often discussed as an activated patient. This patient uses digital technologies to seek and manage health related information, actively work on their health, and engage in preventative measures (Lupton,

2013). In these visions, the patient has been empowered by both devices and by medical professionals. The empowered patient is not just technologically literate, but health literate, possessing the knowledge and capacity to act upon the new forms of information devices like wearables offer.

This chapter explores and interrogates the vision of technologically enabled health empowerment as it relates to older people. It draws together thematic analysis of interview data, patient portal websites, and self-tracking marketing material with network mapping and interface analysis. This enables me to discuss and contrast between the different visions of empowerment that shape care for older people and the complex realities of digitally mediated health care (in which the promised empowerment is often elusive). I show that there are two notable gaps related to how digitally mediated care functions for older people. Firstly, I consider patient portals, one technology promising empowerment. There is a significant gap between what can actually be accomplished with patient portals and the promises that are included in the marketing of such portals. Older people cannot become fully realised empowered patients insofar as the technology for them to be able to do so is lacking. Secondly, there is a significant gap between the empowered patient and imagined futures for older people which centre upon decline. A central tension associated with empowerment is that it is often represented as something that is done to the older person, by technology, health care professionals, or adult children. The older person in this imaginary is sedentary and a potential burden to others in society. When technology empowers the older person, health care professionals and adult children are relieved of a future where the care-demands of older people threaten to overwhelm their capacity. A discourse of empowerment ultimately reifies a harmful, ageist third age/fourth binary.

7.1 Patient portals and the empowerment imaginary

This chapter begins with an analysis of the patient portal. Patient portals were used by more than half of the participants. Although they are not a product marketed specifically to older people, they added more complex associations to the sociotechnical care networks of the participants. To understand the portal, a brief introduction to Aotearoa New Zealand's health system is necessary. One significant and incredibly complex actor-network with regard to care in Aotearoa New Zealand is the 'general practice clinic' or 'medical centre' that delivers

primary health care. Participants had highly variable experiences of primary health care. Medical centres comprise clinical spaces and equipment, medical staff (including doctors, nurses, and other allied health professionals) technical systems, and administrative staff. These services are partially government funded, partially user-pays and operate on a for-profit basis. Medical professionals such as the general practice doctor (the GP) played a role in shaping participants' knowledge of health and their health practices. Digital technologies were explicitly used as part of the relationship between medical professionals and participants. Telephone and internet networks enabled patients to connect with doctors, bringing the doctors clinic into their own homes. The administrative staff and the technical systems used by this group at times acted as a boundary between patients and medical professionals which impacted upon care. Digital technologies such as patient portals enable the flow of health information between doctors and patients, as well as undertaking some administrative tasks.

Patient portals are significant actors to follow because, as will be discussed below, they were an actor many participants encountered in their relationship with their GP. Within the policy imaginary, portals are constructed as solving complex problems of care through giving patients more power and control over their health by way of information provision and reducing costs associated with the provision of medical care. Medical centres in Aotearoa New Zealand generally function as profit-seeking entities within a complex funding and regulatory environment. Were national health care systems to be organised differently, it would make little sense to have multiple, competing software platforms. Given that each medical centre functions separately and is price sensitive, many competing private providers exist. The different features of the patient portal (and the back-end functionalities used by medical centres) reflects that medical centres in this context need particular types of products. The fact that portal providers compete for market share shapes the products they design.

The public facing websites of the two patient portals, myindici and Manage My Health, used by study participants were thematically analysed as part of this study (an interface analysis was also carried out for Manage My Health). The purpose of the website analysis was to elucidate how the key purpose of these technologies was framed by those selling them: what problems of care do they purport to solve and what role do they envision that they will play in care networks?

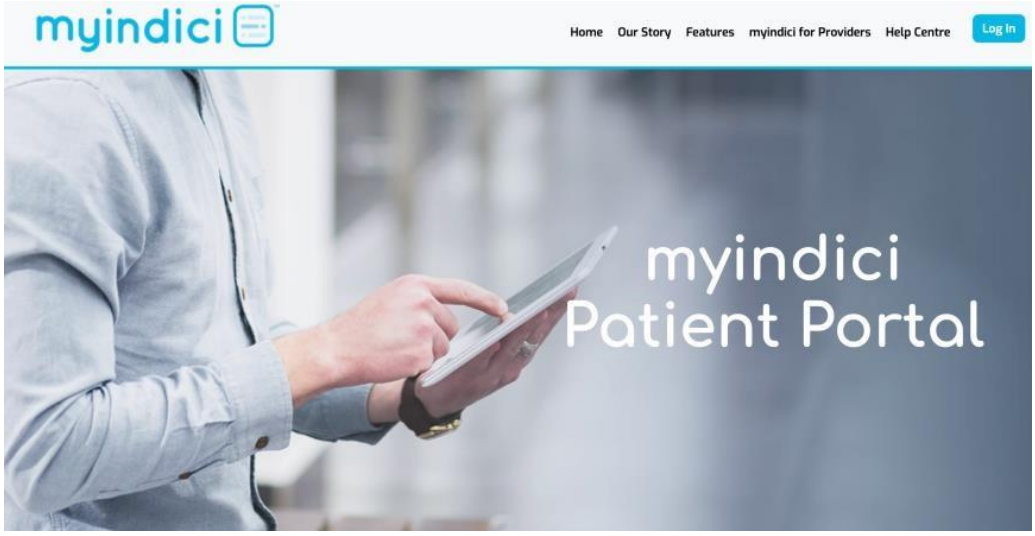

Figure 6 Screengrab of the myindici homepage https://portal.myindici.co.nz/

While these websites at times appear as if they are speaking to patients, for the most part, the marketing material is aimed at medical centres. myindici has just one publicly available page listing it's features and one log-in page for patient users. All other pages within the site address clinical users. Manage My Health has more information for patient users on their website, including twoFAQ pages (one with multiple sections) and a video. The video clearly addresses the patient through statements like:

> "Our vision is to put your health in your hands, by connecting you with your health professionals and bringing all your health information into one place".

However, later in the video it is more ambiguous as to who the target audience is, evidenced in the statement:

> "so patients stay off Doctor Google and build a relationship with their real doctor instead".

The ambiguity around the imagined audience that content is being spoken to reflects that portals position themselves 'in between' two distinct groups of different users. Unsurprisingly, given that it is medical centres that purchase their products, the primary audience is the health professionals. In order to successfully enrol medical centres in their networks, they implicitly offer two forms of empowerment: empowerment for the medical centre as a business as well as patient empowerment.

Patient portals position themselves as being able to improve the functioning of the medical centre, akin to the empowerment of the medical centre as a corporate provider of care. They promise to make the functioning of the medical centre more rational, becoming more cost-effective, efficient, and safe. Key descriptors used about the products on their websites are 'streamlined' and 'seamless'. Both providers stress that their portal product and associated clinic management systems automate administrative tasks. One example of administrative automation relates to processing payments and sending out account reminders. In this way, the portals offer a solution to one problem of care resultant from the partial user pays system – the labour required to manage patient invoicing. On Manage My Health's main page for medical centres, there is a list called 'Why use Manage My Health portal?'. On this page, the first options are 'reduce costs' and 'increase revenue'. This exemplifies the extent to which Manage My Health imagines medical centres prioritise economic aspects. In this regard, the products offer economic rationalisation.

Both providers emphasise the way the products will help medical centres take charge of their business – streamlining consultation visits, simplifying the workflow of clinical staff by reducing the number of screens used, and making information retrieval, entry, and sharing simpler. The problem for care being solved relates to inefficient use of clinician's time. Patient portals and associated systems make the jobs of the medical team more straightforward, empowering them with more time to provide care. Manage My Health explicitly links their product with improved safety and the reduction of data entry errors. myindici positions their product as being a "modern technology" that is able to facilitate collaboration and is easily customisable to meet the specific needs of individual patients and medical providers. In this regard, the patient portals rationalise care by making it more modern and safer.

This care is also framed as explicitly empowering patients. The provision of individualised care that the customisable interface offers closely links with the core rhetoric of empowerment. Both providers explain that their product will empower patients by giving them access to more information, including that which was once inaccessible such as clinical notes. Further, the portals are positioned as offering patients more choices over how they receive their care (online or face to face) as well as simplifying tasks such as ordering repeat prescriptions. It is imagined that this will "put people's health in their hands". The version of empowerment outlined here is closely linked with datafication and with connection.

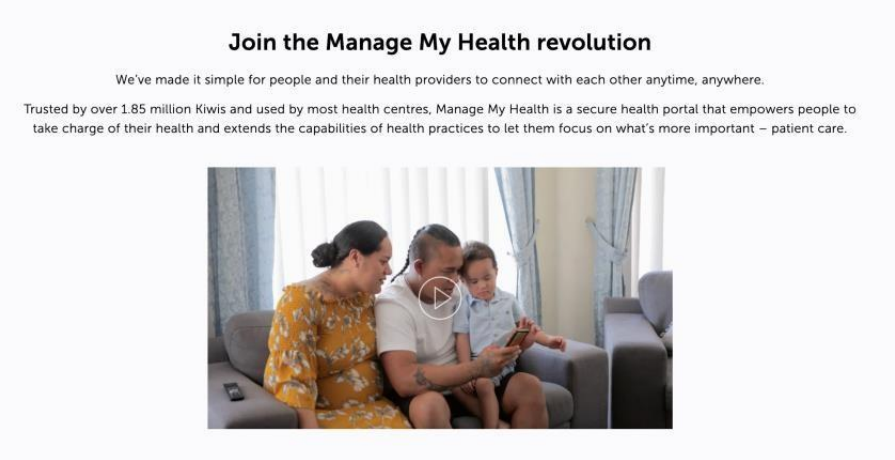

Figure 7 Screengrab of the video on the Manage My Health homepage https://managemyhealth.co.nz/

Being able to easily share and creatively visualise information is central for empowerment. For example, myindici emphasises that their product is compatible with wearable devices. Wearable devices convert qualitative aspects of a patient's life (such as activity levels or sleep quality) into quantitative data (Ruckenstein & Schull, 2017). This information is then displayed to patients in "highly visual" ways and can be shared easily with the medical team. Being able to quantify, see, and share this information is imagined as enabling the patient to have a realistic "up to date" sense of their health.

A vision of care that foregrounds the economic aspects of medical centre service provision and the responsibility of patients is thus mobilised by the two patient portals. This version of good care does articulate solutions to imagined problems for both the 'caring for' and the 'cared about'. Even if the portals are not being marketed directly to patients, this marketing does still create a role for the 'ideal' patient that will reflect and shape how medical professionals approach older people seeking care. At present it is only once medical centres come to employ these portals that they became part of the sociotechnical care networks of my participants. Medical providers are mediators in chains of associations: they inflect original intentions of the software providers and are a consequential actor within sociotechnical care networks including patient portals and older people.

7.2 “She is getting a lot more of me messaging her”

For the study participants, actual experiences with patient portals were complex and contradictory. To an extent, a version of empowerment was achieved through access to better information, a spatial re-organisation of the care relationship, and a reorganisation of power dynamics in the medical care relationship. At the same time, patient portals also introduced novel ways of disempowering older people in their roles as patients by making information harder to access and giving people less of a sense of control over their own health. As participants, medical providers, and the portals interact and translate one another, affective and practical care for participants was both generated and made more difficult.

The introduction of the patient portal meant that information could be exchanged more easily, quickly, and outside of the traditional clinic setting. This benefited care in several different ways. For a small number of participants, it made practical tasks related to medical care more straightforward. Ordering prescriptions was one aspect of care that was made quicker by patient portals for some participants. Alan showed me how he uses his portal to order prescriptions:

> “And there I can get, I have, um regular scripts for blood pressure. God knows why! But anyway. It’s generic probably. Um and I just go in here when I need to update a script. The next day they say it is ready to pick up or they will send it to the chemist for me.”

Being able to use the patient portal made this process feel simpler for Alan. Observing the process, I noted the most difficult part for Alan was finding the email he used to navigate to the patient portal in the browser. Once Alan was in the portal, navigating to order the prescription was easy. In the past, Alan would have needed to find the name and dose of his medication prior to initiating a request for a repeat prescription. He then would have needed to make a phone call to the medical centre to speak with the nurse or leave a message. Now, he can avoid making a phone call and needing to remember his medication name. The benefit for care in this kind of instance was mostly administrative. However, insofar as cumulatively the small tasks of care can be felt as burdensome, the intervention was welcomed.

A more complex aspect of information exchange that benefitted care was that more communication between doctor and patient was enabled by the patient portal. For the patients

that enjoyed more communication, a marked change was noted. For example, Tina, who lives with many complex medical conditions requiring a close relationship with her doctor, describes the shift in her relationship with her doctor when patient portals were introduced:

> "She is getting a lot more of me messaging her. I can't see her that often, cause she only works two days. And sometimes there are things I want answers to, so I message her"

This example describes how care at a distance is fostered (Pols, 2012). The spatiality of the doctor-patient relationship is altered. The clinical space is extended into the home. Further, the temporalities of the doctor-patient relationship have been altered. The wait-time for an answer to health concerns has been significantly decreased. Tina does not have to wait until her next appointment to ask questions. The introduction of the portal means that Tina can now ask questions of her doctor as they occur to her. For Tina, being able to access her doctor through the portal is a way around a limitation that the doctors working hours cause her. Having a GP that works part time in Aotearoa New Zealand is very common. 49% of the work force is part time (The Royal New Zealand College of General Practitioners, 2022). The example highlights that a particular quality of digitally mediated care that functions to empower participants is through spatially and temporally altering care role of the doctor. Rather an expert who can only be consulted in a particular time and place, the doctor is reconfigured into a more accessible figure, that can offer expertise as the patient needs it. In this way, the patient has more control over a significant health relationship.

However, it was not only the patient portals themselves that were associated with this transformation in communicative norms. Email, as a digital technology that connected participants and medical professionals, was also associated with a change in how these care relationships functioned. For example, one participant (Alan) used a patient portal for some purposes (such as ordering repeat prescriptions as described above) while also emailing with his doctor outside of the portal. In Alan's description of communication with his doctor, he emphasises a new flexibility:

> "And he said to me when I went in, and cause he is a new doctor for us, 'if you ever think you need to see me straight away email me first, okay? And tell me what you are looking for. And I'll ring you or make an appointment'. They always have spare appointments during the week."

The new arrangement really works for Alan – he finds it fantastic. Alan describes what things were like in the past, where the receptionists would 'guard' the spare appointments:

> "Normally, in the past, it would always have been, we would have to ring and … [the receptionist would say] 'oh no, we don't have any appointments until next week'. She [his wife] would let that go. Whereas I would say 'no, no, no'. I'd make her an appointment and I'd get it for her that day. Because you had got to talk to the nurse and say that she really has to come in today. And they are pretty good like that. But they do have this filter"

There are a number of complex interactions revealed here. In the past, the reception team mediated Alan's relationship with his doctor. Alan was able to evade this boundary maintenance work through contacting nursing staff instead of the reception to make appointments. The way that Alan describes the old system and his willingness to 'make a fuss' probably speaks to his gender, age (Alan is in his early 70s) and work history (he has had a career in sales). Nonetheless, Alan and his wife do have health conditions. The new alignment has a tangible effect: it makes the management of these conditions a little easier.

The new alignment of actors promotes an affective sense of being cared for. Being able to email the doctor creates the sense that an appointment is always possible, which is a source of reassurance. This example again highlights one way that digital technology in health care can offer a version of empowerment, by altering a hierarchy between the doctor (previously an inaccessible and guarded figure) and patient (who can now make contact with the doctor directly). In this instance, it is notable that the change in relationships occurred outside of a specifically designed telecare technology. Email was sufficient to generate this effect.

There was a notable lack of consistency across the patient portals, which impacted upon the extent to which the patient portal could serve as a useful tool for patients to seek information and manage the administrative aspects of their health. There was a significant divergence in the features patients with different practices had access to. Even for participants using the same portal, different medical practices had made different functionalities available.

The observation data and the interface analysis of Manage My Health showed that even when specific features were not available to users, they were still present in the interface. For example, when logged into my Manage My Health portal during the interface analysis, I

noticed that 'Book an Appointment' and 'New Repeat Prescription' could be selected from two menus. They are near the top of each menu. This positionality on the page indicates the central importance the designers of the interface understood that they would have. Yet in my portal, these most obvious tasks cannot be completed and link to pages that 'do nothing'. Having unusable sections present makes finding relevant information more complex. Further, what was available on the portals has shifted over time. When the interface analysis of Manage My Health was conducted, it was not possible to order repeat prescriptions. However, this feature has recently been 'turned on' by my medical centre. No communication from the medical centre was received about this new functionality. What patient portals could do in practice appeared to be inexplicable from a user perspective. The portal is translated by medical centres: a particular role is constructed for technology, which impacts on the effects it has for participants care. At the same time, how the interface of the portal functions shapes whether the portal can be used by participants in the ways that the medical centre intended.

7.3 The contingency of patient empowerment

The effects of the patient portal on care are not given but highly contingent. Medical care is inherently *multiple* and involves aligning multiple actor-networks across a number of domains. Analysis of Beth's use of her portals exemplifies the multiplicity and contingent nature of patient portals. In this quote, she explains how she uses the patient portals:

> "I've had blood tests and things. [So] I'll go in and look for the results. And um I've been in hospital a few times and the results, the letters that go to the doctor go on there. So I use it for information".

This quote describes a situation where a digital technology facilitates easier and expanded access to information. For Beth, the primary benefits are convenience via easy access to the blood test results, as well as being able to see new information. She can also view the discharge letter that the hospital staff sent to her primary health care team, giving her access to communications between professionals that she previously did not.

In the network formed, the role as patient that Beth takes on has new dimensions. This is empowering insofar as the additional information means that rather than being 'spoken about' between professionals, Beth is privy to (this form of) communication about her. The extent to which access to this particular information enables Beth to be a more active participant in her

health care is unclear. What is offered is a record of a conversation, rather than access to participate. While in these ways Beth is describing a simple practice of viewing health information, that she can do so reflects complex network dynamics. Each practice described (doctors' letters and blood test results) comprises multiple heterogenous actor-networks. 'Blood test results', for example, are produced by a series of interactions between bodies, needles, clinical spaces, practices of phlebotomy, labs, digital technologies, transport technologies, allied health professions and their attendant sense-making practices, and so on.

Across these complex chains of associations and translations, care and empowerment are contingent on several alignments. The blood results Beth views contain many different forms of knowledge that have been black boxed as a cohesive representation of a bodily system. There have been many translations and many different knowledges obscured to present the results of the blood test. The patient portal displays the blood results. It is not a neutral mediator. In making decisions about how such information will be displayed, and where it will be found, the possibilities for Beth's care and empowerment are shaped. Beth needs first to be able to find the information. She then needs to be able to interpret the information. Whether or not the interface provides norms from population groups will influence how she 'reads' her figures. The interface may or may not have space for 'interpretation' of results by medical professionals. The Manage My Health interface, for example, provides a space for interpretation of results from clinician and the laboratory, as well as a link at the bottom of the lab tests page to an Australian website that explains common forms of medical testing. These kinds of factors shape what Beth does with the information, and the kinds of care decisions she can make. Beth's medical clinic is also an actor impacting her care. They make choices about which patient portal to use, what features to enable, and what results to obscure. Further, the medical centre offer patient education that shapes how Beth makes sense of the results. How different actors align shapes how information is legible, accessible, and useful in managing and understanding medical care. Empowerment, for Beth, is something that is contingent on the decisions of several different actors.

How the patient uses the patient portal also shapes whether and how care and empowerment are achieved. Each participant had different experiences and motivations that influenced how they approached the portal. Medical care comprises many different practical tasks across many different domains that will be more or less important to people with different health needs. Getting the portal to work for care in many instances required the participant be willing to

invest time in using the portal and experimenting with what was possible based on their goals and circumstances. For example, while Beth used the portal for accessing test results, not all aspects of Beth's care were managed through the portal:

> "And I'm supposed to be able to order prescriptions through it. But for some reason the prescription thing won't come up on that. In the app. But I'm wondering if it will come up if I used it on my laptop."

In this instance, Beth suspects that she cannot do this because of the device she is accessing the app through. It is not clear exactly why ordering prescriptions does not work for her. The situation of the patient shapes whether and how care will be achieved – the technology that they have access to (or do not have access to) matters, but also their cognitive, physical and technical abilities, the quality of their internet connection and many other factors. Beth's solution so far has been to continue with the older method she had for repeat prescriptions, and she has not endeavoured to utilise her laptop. While this does not matter to Beth, the example more generally highlights the many different actor-networks that need to align if a portal is actually able to streamline care from the perspective of the patient. For empowerment or meaningful improvements for care to result, multiple successful translations need to occur in the interactions between patient – medical provider – portal.

From the perspective of the participants, it was more common that the patient portal interface and the medical centre played destabilising roles in the participants sociotechnical care networks. Ultimately, the portals made care in particular domains harder to achieve for study participants. Challenges related to how information was displayed, what information was displayed, and what could and could not be done with the portals. Tina, as discussed above, finds being able to contact her doctor through her portal incredibly beneficial. However, the way that her patient portal organised information was not entirely legible to her. Tina liked being able to use the portal to have access to test results. Yet Tina finds the portal quite "clunky" to get around. While accessing the test results generally is straightforward, when it comes to how the different types of health information is presented to her:

> "It's not as easy. If I want to have a look at all my CRP I have to go and find all the CRP"

When in the clinic with the doctor, Tina can view multiple CRP results at once and identify patterns in her health (related to the CRP, a particular disease marker) through time. On the

patient information that she has access to at home, she can only access the CRP by clicking into individual test results.

In this instance, portal design is an actor shaping the extent to which Tina can achieve care. The interface that Tina views in the medical centre is more sophisticated and has more information than the one she can access at home. Tina has complex health conditions and the regime for managing these conditions that she has in place involves keeping track of particular bodily metrics. There could be several explanations for why this functionality is not accessible, or at least is not easily accessible. One explanation as to why such a feature may be lacking could be because of assumptions made about the users of portals and the types of knowledge and features that would be useful to them. Particular identities are inscribed into "design process of systems of telehealth care" (Mort et al., 2009, p. 16). Visualisations such as the concentration of blood components over time might be considered part of clinical care and not patient needs.

Patient portals position themselves as an intrinsic part of the sociotechnical networks of medical care as a key actor in producing patient empowerment. This positioning is contradicted because they do not appear to function in ways that meet the needs of pro-active users that take responsibility for their own health conditions. A key problem for the patient portals was that in practice they simply did not function in ways that worked for those patients that used them. All study participants were technology users and did have, at least to a degree, some confidence across a range of portals. Tina's observation that her portal is clunky was expressed by other participants. Daphne even used the exact same descriptor which raises questions about which actor-networks benefit most from their introduction.

Exemplifying this, while Tina and I looked around the health portal and discussed how she uses it, I notice a section called 'vital signs' and asked her what it does. As she was not sure, she clicked onto it. She was pleasantly surprised at the information she finds there as it looks to be relevant information for her. Tina had not accessed this section before. Tina is very literate with regard to her health and technology. She had significant knowledge related to her health conditions and their relevant markers and had additional experience navigating medical care from the perspective of supporting family members. She uses many different devices. That she had not previously found the section was somewhat surprising.

Patient portals purport to solve two care problems, offering medical clinics a means to streamline how they provide care and information to patients to enable better management of health. In some respects, these goals are contradictory: the customisation necessary to manage the plethora of care needs an individual has would require time and labour from clinical staff. The ultimate 'customer' of the patient portal is the medical centre. More time is spent 'convincing' them to use the portals and patient experiences with the interface suggest that efficiency of the 'back end' systems for clinicians is a design priority.

In the most extreme case of the destabilisation of care, the patient portal was associated with a degree of novel harm. Rather than enable communication with a doctor, the portal had introduced a new and stressful communicative dynamic between provider and patient. For this participant (Daphne), this had undermined her affective sense of care and diminished the sense of control she felt regarding her health. At first, the portal had worked well. Through the portal, Daphne had received reminders about routine testing that she acted on. Daphne had used the messaging functionality to ask her doctor a question and had received an answer. In the incident in question, Daphne received an automated email alert saying that she had a notification. When she went into the portal, she was unable to find the notification or anything that it might have referred to using the portal interface. This caused her quite a lot of distress and she had complained to the practice about it. She eventually concluded:

> "If they want to get in touch with me, they would get in touch with me. One would hope. But some people might be concerned about that, you know, they might be anxious that they had missed some information."

When the portal was functioning well for Daphne, the medical centre and the patient portal functionally appeared a standalone entity. The portal had been successfully translated by the medical centre, so that tasks associated with the medical centre (sending out reminders) were being carried out. This was evident to Daphne. The portal interface had predictably enabled communication between Daphne and the medical centre. In the interaction between provider – portal – patient, Daphne became an empowered patient. Her encounters with this actor-network were predictable and ultimately elicited a desirable result where she was better able to manage her own health. The automated alert was an event that changed how this care network functioned.

A destabilisation of care resulted from the way that the portal and the medical centre did not 'hang together' and 'hold' in a way that enabled them to produce care. The 'source' of the alert was not clear, but it could have been an alert related to COVID (I noted the email Daphne showed me was from around the time of the first lock down), an error related to the portal functioning, an error related to the medical centre, or something else entirely. The fact Daphne had stopped receiving notifications about routine testing was a further problem impacting her experience of care. It was not evident whether she had missed automated screening reminders and/or an important communication from her doctor. The medical centre and the portal were now encountered by Daphne as separate actors with an unclear relationship. This was exacerbated by concurrent significant changes to how general practice medical care was delivered in Daphne's community. All the small general practices had recently amalgamated into one, in a process beset by 'teething problems' for patients including lengthy wait times.

For Daphne, the effect of this network failure was that care felt unmanaged. Rather than the technology and medical provider acting in concert, they each functioned in unpredictable ways. It was not clear to Daphne what the reason for the alert or cessation of reminders was – the delegation of responsibility in a sociotechnical care network was not evident. Changes in communicative norms and changes in how information is displayed to patients can offer some benefits for care, and even be empowering. But these benefits are highly contingent upon the functioning of other actor-networks. One component of empowerment is control; the ability to be an active participant in health care. This sense of 'control' over health relies upon a precise alignment of actor-networks. Control requires having access to the health information you need and functioning communication channels. When this is not present, empowerment cannot result.

Empowerment in relation to health care, as discussed so far, has largely been understood in terms that have been defined by markers that strongly reflect the context of a neoliberal clientisation of health and social services as well as the marketing claims of telehealth providers. This section has focused on whether alignments of people, technologies, and medical providers enabled participants to have new kinds of relationships with medical professionals, greater access to health information, and more avenues to participate in their health care. While these kinds of goals can be realised, in practice, sociotechnical care networks often did not function in ways that led to these kinds of empowerment. A focus on the empowerment of individuals can elide the broader networks necessary that must be aligned

for care (and experiences of care that can be deemed 'empowering') to be achieved (Prainsack, 2018a). The agency of a technology, it's capacity to effect, is distributed, so how a technology is used in practice by medical professionals and patients shape the outcomes for care (Latour, 2002; Prainsack, 2018a). The economics of medical care in Aotearoa New Zealand, where medical practices operate as for-profit entities in an underfunded sector, impact upon how portals are designed and used.

Non-use of the patient portal is produced similarly. Refusal to use the patient portals was not widespread, but when it occurred was linked strongly to the way that medical centres are operated and ran. In the examples above, when care and empowerment did result from sociotechnical care networks, there was both a practical reorganisation of actors (new roles were created for the doctor, or boundary-work was evaded) and an affective quality (there was a particular 'fit' between clinician-provider-patient-technology that met the patients' expectations of 'good' relations) (Pols, 2012).

In the strongest, most directly articulated example of refusal to use a patient portal the problem was not the technology, but the kind of health care relationship it scaffolded. Viola's refusal to use a patient portal was part of a deliberate strategy to ensure the best medical care for herself. Viola is in her 80s, lives alone in a rural town, and has had many health issues over the years. She has a variety of experiences of medical care, including with doctors and home support services. While she did not go into specific details, she mentions that some doctors "left a lot to be desired" and that "there were problems at first" with her home support.

At the time of the interview, Viola is happy with the care arrangements she has. She feels her health has been better in the past 18 months. She has a health management regime that is working for her. Viola's refusal to use her patient portal does not reflect that she lacks technical literacy. Viola explains her decision not to use patient portals by evoking a broader concern with how the practice approached administration prior to introduction of portals, and the impersonality of telehealth generally. When I ask if she uses a patient portal, her first comment is:

> "No I don't. And I absolutely refuse to. It's, when we phone our medical centre here, [another rural medical centre 30 minutes drive away] answer."

This is a significant concern with Viola. Viola, implicitly, is drawing a link between portals and new administrative systems (related to how calls to the medical centre are fielded) that in her opinion degrade the quality of care she receives. She wants to be able to speak to the local receptionists, who are aware of her conditions and needs, when making appointments. Her issue relates to the importance she places on locality of care – the new system diminishes this. She chooses to go into her medical centre and make appointments that way.

The example highlights the way that economic decisions (in this case, related to regionally centralising aspects of clinical administration to save costs) made by medical practices impact upon a patient's experience of care. Expectations of care that patients have, the kinds of caring practices that they value, and their interpretation of the emotions generated are all important in determining the effects of sociotechnical care networks (Pols, 2012). Refusal is linked with protecting a valued mode of communication and resisting changes to how care is delivered. Refusal of patient portals highlights a much broader point: empowerment is not just about aligning sociotechnical actors to enable communication or the transfer of information but is also linked with quality and valued relationships with medical providers, relations made fragile by changing health care settings.

7.4 Self-tracking to empower the healthy, active ageing self

Patient portals are not the only technology that markets itself as offering empowerment for patients. Digital devices that offer self-tracking functionality also draw heavily upon a rhetoric of health empowerment in the marketing of their devices. These devices promise to transform and extend a person's capacity to self-care (Lupton, 2017), motivating their users to take control of their health and adopt a healthier lifestyle (Ajana, 2018). In the interview data, the expectation that tools such as smart-phone applications or fitness watches would empower participants to become more active, healthier people was one of the reasons that sociotechnical care networks formed. In these discussions, a lack of physical activity in older people was presented as an individual problem that can be overcome with technological interventions that support activity by providing reminders to move through the day, quantifying physical activity, and providing motivation to engage in more exercise.

Beth's discussion of how she understood a self-tracking product might work for her perfectly illustrates one way in which digitally mediated care is imagined to function for older people to produce empowered, healthier selves. Beth is in her 70s and lives alone. While she considers herself in fairly good health, she has had some health concerns and hospitalisations. When I asked her about how she uses technology in relation to health and exercise, she says:

> "I was actually thinking that I should buy one of the step things. Watches. I don't know how much they are? I did have one once that you hooked on here [points to waistband] and it wasn't very accurate. And it was only a cheap one. But they said something about on your hip there, it wasn't as, it was inaccurate. But whether, how the wrist ones are different, I don't know. But the last few days, actually, I've been thinking about getting one. Because I don't do as much exercise as I should. If I got something visual. I mean I should get on that [points to a stationary cycle] every day but I don't."

Beth's statement expresses a version of a sociotechnical assemblage that could be assembled to achieve a version of good self-care in the form of being more physically active. In Beth's description, she is unable to be as active as she would like without the watch. Beth explained that she finds it easy to get caught up in book and realise that she hasn't moved for a few hours. Such inactivity is understood as a risk to her health, a failure to properly self-care. Failure to properly self-care is associated with guilt (Kent, 2018a; Lupton, 2013).

Thus, Beth is facing is what Callon has described as an 'obstacle problem'. The obstacle problem is two-fold: that she gets caught up in reading and that she does not get on her stationary cycle as much as she should. Beth hopes that through enrolling a self-tracking device her relationship with the book and stationary cycle will change. Good self-care will be achieved by assembling sociomaterial actors (the stationary cycle, the book, her body, her bodily practices) and making these diverse elements interact in a particular way. The purpose of the self-tracking device is to help Beth bring about a necessary alignment and to be able to manage the shifting interactions over time. Beth's quote is a description of attempted translations, where she is recounting attempts (or future attempts) to mobilise other actors (a pedometer and a smart watch) into a network to achieve the care goal of being an 'active older person'.

Using Callon's (1986) method for describing the process of translation, we can see that a seamless translation has not occurred in the context of this example. A seamless translation would be where these mediators were enrolled into a care network to achieve the goals defined

by Beth. In the first stage of the attempted translation, the problem was identified by Beth – she is not active enough and does not do the exercise she feels she should. Following identification of the problem, other relevant actors were identified (notably, the pedometer). The pedometer could count steps to help prompt Beth to achieve an appropriate level of activity every day. In the next stage, Beth enrolled the actor. She acquired the pedometer and set it up. If successful translation was to have occurred, the network could have been mobilised to function in accordance with Beth's goals. However, this attempt at translation failed.

A new actor has been identified - the smart watch. The smart watch is understood to be able to offer new agencies, new capacities that will make the sociotechnical network function to produce good self-care. The new capacities are more accurate recordings of activity, the ability to visually represent that activity in new ways, as well as reminders that prompt activity. Technologies obviously do not simply realise human goals and intentions. Beth was not able to enrol the pedometer to realise the goal of quantifying her movement. The pedometer was a mediator. Rather than simply enabling Beth to achieve her goal, it distorted the meaning that it was supposed to carry (Latour, 2005). It did not keep an accurate method of activity and present it to her in a way that prompted her to be more active. Yet, Beth envisions that a modern tracking device will have the capacity to display information differently, in a way that is able to move her to more activity, as well as offer specific prompts that will disrupt the interaction between Beth and her book.

The insight here though is not so much that the materiality of a technological device destabilises care and empowerment (although this is certainly important and discussed elsewhere). What is of most analytical interest in terms of the implications for how care networks form is the reason *why* the actors were enrolled as they were, why particular technological artefacts are understood as being able to perform particular care roles.

ANT posits that actor-networks do not exist in isolation but are connected flatly to other networks. While Beth speaks from the position of an actor attempting to assemble a network, she is also an actor who has been translated. Her words and actions speak to her enrolment in many other networks, all of which affect how and why the care networks she is part of form. The problem of inactivity exists because Beth has a set of ideas about good care, and from this, the understanding that to be not moving enough is to be performing inadequate self-care.

Following the actors present in Beth's descriptions, one explanation for why Beth has this problem is that she has health conditions for which she has been hospitalised. Part of the at home management includes physical activity (regular movement and use of the stationary cycle). Smart watches and pedometers weren't suggested to Beth by her medical team, but nonetheless were considered by Beth as possible solutions to the problem of inactivity. In framing her inactivity as a problem that she must act on in order to achieve proper self-care, Beth's words reflect that she has taken up a particular network position. She frames herself as a problematically inactive person in need of reformation. Beth adopts an understanding of care that draws on a binary 'healthy and active' (good self-care) or 'frail and inactive' (bad self-care) framework (Tulle, 2015). This understanding comes from an active ageing discourse which constructs sedentary activities as 'naughty' or 'shameful' (Martin, 2021).

7.5 "Enjoy the life and memory extending benefits for many years to come"

The vision of empowerment that the marketing of self-tracking devices differs when addressing older people. The self-tracking device can empower the older person to more effective self-care by managing their health conditions, engaging in lifestyle activities that prolong functional capacities (such as range of movement) while preventing or delaying the development of future health conditions. Mitigating, identifying, and preventing risk and decline become a focus when self-tracking marketing considers age (Marshall, 2018). I analysed a selection of publicly available, web-based material associated with fitness trackers used by the study participants. These actors were recruited by visiting the websites (including the news and blog sections) and YouTube channels of such companies. As there was too much content to search through, in website search functions were used to search for references to: age, elderly, senior, older people, and older adult. In this material, where older people were represented, it was in line with a framing where activity is vital for ageing healthily. Older people were depicted as active. As will be discussed further later, younger people were positioned as important actors that can encourage older people to be active.

An example of the activity imperative that frames ageing and self-tracking can be found in Fitbit's sharing of the story of Sylvia Lask. Lask was a woman in her 80s whose life as a prominent mental health advocate was chronicled as part of a Columbia University project aimed at 'shattering cliches' associated with ageing (Mailman School of Public Health, 2017).

Sylvia's story included discussion of her walking and her Fitbit use, and was repeated in the mainstream media (Bruno, 2018) and on Fitbit's blog (Block, 2017). While the story did not seem to originate with Fitbit, the company nonetheless contributed to its circulation. The Fitbit blog makes an explicit link between self-tracking, the prevention of inactivity, and good self-care: Sylvia says her time with her Fitbit Charge 2 is all about taking care of herself and being there for her grandson. Purchasing it was a financial stretch, but she believes it is well worth it:

> "I never would have paid what I paid for this. I'm not sorry, it tells you your heartbeat. It tells you when to slow down. In the morning, it tells you 'Time to go.' I am not sorry. Sometimes you have to do something for you. If it's going to make your life better, why not." (Block, 2017, n.p.).

This quote positions the fitness watch as radically transformative. The Fitbit watch is described as offering prompts that make Sylvia change her behaviour. The device is described as being able to generate information about Sylvia's bodily function and make attendant decisions about her activity levels ('slow down' or 'go'). It is implied that these are decisions Sylvia would not make on her own.

The watch is positioned as empowering Sylvia. Her life is improved because she is making better decisions about how to care for herself. This benefits not just Sylvia, but her grandson as well. The immenseness of this benefit is positioned as justification for an expensive device. The notion that a Fitbit is (as per one participant) an 'expensive toy' is directly challenged in this quote. The Fitbit is being framed as an investment in health. The quote is illustrative of the way that being active is strongly linked with improvements in health that can be realised with the right technology.

While Lask's story highlights an older person as an empowered user, other marketing material for self-tracking devices speaks to those who care for older people. Public-facing materials for Fitbit suggest that gifting a self-tracking device can be a practice of caring for older people by helping the giftee become more active and healthier. In the most direct example of this, a blog on the Fitbit website is called '9 Reasons to Give Your Dad a Fitbit Tracker' and offers a list of reasons that gifting a Fitbit "could help your dad live a healthier, happier, and longer life" (Kosecki, 2017, n.p.).

However, it is also implicitly suggested that encouraging an older person to use a Fitbit is a care practice. In other publicly available material, Fitbit discuss the benefits of their products for older people without explicitly addressing older people as the audience:

> "Let's take a closer look at four important ways that Fitbit provides support and insights for older adults in their health journey" (Fitbit Team, 2022, n.p.).

The word 'you' is used on the webpage less frequently than the phrase 'older adults' suggesting that the reader may not be part of this group. Presenting information about older people without addressing older people specifically imagines that the audience for such content are those that care for or about older people, not older people themselves. There is a strong implied family responsibility in the use of terms like 'dad' and 'parents'. A way of organising care which positions adult children as the 'natural' caregiver for older people is reinforced. Gifting a Fitbit, or encouraging a parent to use one, is a way that adult children can manage this care responsibility and ensure their parents are taking action with regard to their health.

The Fitbit is positioned as a tool that can be drawn upon to motivate older people to be more active. This is a trope that is repeated in marketing and discussions surrounding the Fitbit. A blog entry on the Fitbit website "How to (Safely) Get Your Ageing Parents to Move More" quotes an academic and 'expert on exercise in older adults':

> ""It's very difficult to tell someone what to do if they aren't self-motivated to do it," says Chodzko-Zajko. "We used to talk about an exercise prescription, where the doctor would tell the patient what he or she needs to do. I think it needs to be more of a bidirectional dialogue—jointly focusing on how to increase the amount of time you exercise."
>
> Here's how to begin that conversation so that you and your parents can enjoy the life- and memory-extending benefits of an active lifestyle for many years to come."

It is implied that the 'person that must be told to move' in this extract is an older person. Firstly, in the blog it is taken from, the importance of exercise for older people is discussed. Secondly, the idea that older people are problematically sedentary is a common way of framing ageing and movement. Through the blog, more activity is established as an important goal for older people, and something that those that care about older people should encourage. In contrast to the quote in the previous paragraph which describes Lask's Fitbit 'telling' her to move, in this extract, 'telling' a person to be more active is presented as difficult.

The older person is subtly positioned in this extract as a challenge. The older person lacks the self-motivation to be active, which makes the work of those people who seek to empower them difficult. The seriousness of the sedentary older person is highlighted by the imagined future of dementia and cognitive decline that is evoked by the phrase 'memory-extending'. Elsewhere in the piece, the seriousness is also reinforced with references to research:

> "In one study of more than 1,600 sedentary men and women aged 70 to 89, those who started a moderate-intensity exercise program were 18 percent less likely to become disabled during the two-and-a-half-year study period".

While not stated directly, failure to empower older people to become active is presented as consequential. It is implied that an inactive lifestyle in older people will lead to disability and cognitive decline. If the tension between the challenging ageing person and activity is not resolved, the result will be a potentially burdensome care responsibility for younger people. The reader is not directly encouraged to purchase a device for their parents. However, at the end of the blog, Fitbit's 'reminder to move' function is mentioned and many of the suggestions in the blog link closely with the capacities of the Fitbit. The Fitbit is implicitly constructed as a desirable solution to the 'problem' of inactive older people. It offers a way to depersonalise the advice to move more and 'tell' older people to move in an effective way. By providing information and reminders, the device is depicted as producing the motivation to do exercise so that this kind of empowerment is possible for the (inherently declining and unmotivated) older person. Responsibility is shifted from the adult child back to the older person.

The active ageing discourse shapes how empowering forms of digitally mediated care are understood, shaping how older people self-care and the kinds of care interventions that seem sensible to others in their lives. Marketing materials and public discussions of smart watches offer one very particular solution for care: they offer a way to engender a new, non-problematic, active way of being. When older people take up this role, and purchase or receive smart trackers, there has been a successful translation, where the various actor-networks comprising that smartwatch industry have defined a role. A consequence of this successful translation is that the discursive problematising of older people's 'inactivity' is reinforced, strengthening a way of understanding age that foregrounds individualised responsibility. Further, other solutions that might be more appropriate to encourage older people to increase their activity levels and prevent being in one position for too long have been foreclosed. When positioned

as solutions to problems associated with care, companies such as Fitbit are influencing the shape and form of caring networks and how particular care practices are chosen.

7.6 Digitally mediated care beyond empowerment

Being more physically active is a core management strategy for many health conditions older people experience. It is imagined to be central in preventing negative ageing futures where older people require extensive care. The extrinsic motivation that self-trackers purport to offer comes from the broader quantification of ageing: the presumption that the presence of more information about the body will engender better health outcomes.

For one participant, self-tracking had been suggested by a medical professional. Notably, this suggestion was not explicitly framed as encouraging the participant to be more active, but as a way to *quantify* activity already being done. Being more active had been suggested to Trevor by a specialist, to manage living with a heart condition. His wife also has a serious health condition that is managed through lifestyle modifications such as exercising and diet. Making sure to eat well and move each day had become part of their self-care routine. At the suggestion of a cardiac specialist, Trevor used a Fitbit to quantify how much exercise he was doing:

> "…I went to the hospital for a check-up. And, um, the specialist said, 'oh what do you do for exercise?' And I said 'oh I walk I walk the dog and um that kind of thing'. And he said, 'how far do you walk?' And I said, 'I don't know'. You know. He said, 'in distance?'. I said, 'I don't know.' You know. 'Well', he said 'why don't you get yourself an exercise watch?'."

Trevor did not articulate exactly why being able to measure his activity offered benefits for his care. In this re-telling, the specialist positions the watch as offering a more accurate, more useful insight into Trevor's physical activity than Trevor himself could. In this way, the specialist draws on an imaginary that constructs the data given by a device as objective in comparison to the subjective data offered by a patient (boyd & Crawford, 2012).

In Trevor's medical care network, the specialist has an important position. He possesses vital knowledge. Trevor is very conscious that his health condition is life threatening. As such, the suggestion to get the exercise watch was taken very seriously. He decided to purchase the watch voluntarily, but it is important to recognise that he would not have got the watch had it not been

suggested. This is an example of 'pushed self-tracking' – where the process of quantifying the body is initiated in response to external encouragement (Lupton, 2014). Getting the watch itself was quite an arduous task. The first watch was faulty and would not hold charge. The watch requires a degree of maintenance; it must be synced with an app on his smart phone. Even the new watch requires regular charging. These new behaviours are now part of Trevor's self-care routine, part of what is done to manage his condition.

Yet, the actual effect that the watch has had on Trevor's exercise is negligible. In practice, purchasing and using the watch has not turned Trevor into an empowered, active patient. While getting the watch quantifies his activity levels for him, the information the watch generates is not something that he takes too seriously. During the conversation about how he uses the activity watch, he remarks:

> "I don't really analyse it that much. Sometimes when we get into bed my wife will say 'I've done so many steps and what have you done? I've done more than you!' And I say 'yeah, because you took shorter steps than I do and it counts that!'"

This is just friendly banter between Trevor and his wife. The information does not change how he makes decisions about what exercise to do. He does not feel like he has a particular target, and the quantification of distance is not meaningful to him. Trevor recognises that his activity levels will fluctuate based on other things he has going on each day. He also mentions that the weekly reports of his activity contain inaccuracies such as saying he climbs several flights of stairs each week (he does not).

To this end, Trevor has not become an idealised digitally engaged patient. The digitally engaged patient is one who acts upon data to to 'optimise [his] health' (Lupton, 2013). While Trevor's substantive behaviours have not changed in this regard, there is nonetheless an intensification of the *responsibilities* he has as a patient – he now generates information for the specialist. This can be understood as a form of discipline (Fotopoulou & O'Riordan, 2017; Oudshoorn, 2011) insofar as new behaviours are now expected of Trevor in the name of selfcare. A consequential translation has occurred here. The specialist has ordered the network so that Trevor, the Fitbit, and the data it produces are held together as one technologically enabled patient.

The effects of digitally mediated care for older people in practice, however, are often not the same as what the medical provider or technology provider intended. The Fitbit has ended up

becoming an integral part of Trevor's care network, but not because of its ability to measure Trevor's movement. When the heart beats, the volume of blood in the blood vessels closest to the skin changes, making them contract and expand. Fitbits use an optical sensor (LED lights that flash hundreds of times each second) to detect these changes (McMullen, 2020). This data acts as a proxy for the heart beating. The device extrapolates a heart rate from the data it collects. Importantly, this information is being continuously collected. Trevor has the Fitbit set so that it will alert him if it generates a pulse-approximation of over 140. If the Fitbit goes over this, Trevor takes his own pulse to confirm and can contact the hospital. The Fitbit is not wholly accurate in this regard. Trevor suspects it gives the 'right' reading about 90% of the time. Accuracy is less important, in terms of achieving a sense of being cared for, than consistency. Having the background awareness that the device is working in the background offers reassurance and peace of mind.

While the Fitbit was initially suggested as a way to quantify exercise, it has ultimately provided a much larger sense of reassurance for a wholly different task. While the marketing materials of self-tracking devices and the 'active ageing' discourse make particular care practices (such as quantifying movement in this example) seem logical, necessary, and empowering they are not automatically the ones that matter to patients.

7.7 Conclusion

Being responsible for health through discerned engagement with health care professionals and robust self-care practices is a marker of good neoliberal citizenship. Digitally mediated care interventions such as patient portals are imagined as flattening the hierarchy between doctor/patient and providing patients with expanded access to their health information. Further, digital technologies offer those that seek to empower older people with new tools.

This chapter has focused on two notable empowerment gaps which highlight crucial dynamics related to how care networks function. First, there is a significant gap between the imagined empowered patient who fully realises their responsibility to be a good ageing citizen and what is actually possible for older people. Patient portals, in particular, were found to be often inadequate for supporting care. This gap reflects that the technical infrastructure for older people to effectively realise the imagined benefits of digitally mediated care simply does not

exist yet. Secondly, this chapter has presented a notable tension between the empowered patient and the nature of the older person as heading toward a future of physical and cognitive decline. The self-tracking device is imagined to be able to transform the unmotivated older person. Adult children have a responsibility to facilitate this transition. Underpinning digitally mediated care interventions is a desire to avoid future care burdens.

The different versions of health empowerment discussed in this chapter centre on offering the older person-as-patient more control of their health information and the ability to take control of their lives and become more active with self-tracking devices. Yet, in many ways, older people's engagement with digital technology most benefits other actors. When older people use patient portals, medical centres are empowered as businesses, functioning more effectively. When older people self-track to become active, adult children are relieved of a potentially burdensome care responsibility. Ultimately, the chapter raises serious questions about whether visions of empowerment are desirable. How digitally mediated care works in practice to achieve empowerment often does not reflect the needs and priorities of the older person. This impacts how well digitally mediated care actually functions for older people.

8. The temporal dynamics of sociotechnical care networks

This chapter discusses the temporal dynamics of sociotechnical care networks. Both time and ways of talking about time can be considered agential actors that shape how digitally mediated care functions for older people. Primarily using thematic analysis and network mapping of the interview data, I chart the different ways that time and the way time is apprehended impact how digitally mediated care functions. The routines of everyday life are maintained with digital technologies; they are an actor involved in producing the sense of 'normal' time. There are different aspects to this. For the participants, digital technologies presented new ways of managing and making sense of time. They introduced new routines as well as presented ways to save, control and fill time. There were affective benefits to this – it produced a sense of 'normalcy' and competency.

However, the temporal functioning of digitally mediated care makes evident the ways that older people are connected to larger networks comprised of political-economic actors. As the previous analysis chapters have consistently highlighted, sociotechnical care networks often are not arranged in ways that reflect the needs and priorities of older people. In cultures of speed, older people must undertake new forms of labour, specifically to 'keep up'. Older people are devalued in new kinds of ways. This chapter closes by highlighting the caring about devices that the study participants engaged in. This care reflects a mismatch between the values that shape that sociotechnical care networks and those of the older people they (supposedly) care for. It is an act of resistance against the speed of consumption of digital technologies.

8.1 Routines, new care metrics, and the commodification of leisure time

One of the ways that digital technologies were imagined by participants to be able to benefit them, was through the 'saving' of time. Specifically, time could be saved by making different elements of self-care (related to health or meeting basic needs) easier or by automating them entirely. Digital tools that in theory ought to have saved time often did not work as expected to realise time saving promises in any straightforward way. In this section, I discuss a striking example of how a digitally mediated care practice (the introduction of a fitness watch for tracking exercise) did not 'save' time but rather introduced an entirely new temporal experience in a care network.

The example comes from Hilary, a professional in her late 60s, who had purchased a series of fitness watches to help her track and manage her exercise. Exercise had been a constant feature in her life. Hilary had an established exercise routine and established practice of tracking her exercise that significantly pre-dated her enrolling the smart watch into her care network (previously, Hilary had used notebooks, recording the type and duration of the exercise she had done manually). Having a record of the exercise she has completed enables Hilary to ensure she is 'doing enough' exercise, as well as develop goals and track her progress toward them. As Marshall found, self-tracking can self-confirm that an older person is 'actively ageing' (Marshall, 2018). This kind of self-tracking is a way of caring that enables people a sense of control over the body (Lupton, 2016) by rendering disorganised, imperfect bodies into orderly and manageable data (Lupton, 2015). The role for the fitness watch in Hilary's care network is to automate this task. The fitness watch also affords new capacities like displaying her heart rate.

Rather than realise the temporal experience of 'saved' time for Hilary, the addition of the watch to Hilary's care network produced a complex and novel temporal experience that impacted on self-care. There have been lengthy and repeated setting up periods where time was not felt as 'saved'. The first watch purchased (a Fitbit), did not work as expected. It did not display Hilary's heart rate on a seated cycle in gym class and was not suitable for swimming. Hilary still found herself needing to enter information about the exercise she had done. Over the four or five years she has been using the devices, Hilary has needed to replace the watches several times due to the watches ceasing to work properly. This was sometimes a hardware issue (the watch itself would stop working) and sometimes a software issue (an aspect of the functionality would stop working). Needing to replace and set up the watches takes time. Further, Hilary's tracking routine gives her a sense of control over time (by allowing her to look back over past exercise and evaluate what she has done and how she is progressing). When the watches stop working, this significantly destabilises her self-care routine. Hilary is used to checking her steps and monitoring her exercise, not being able to do this erodes her sense of control. The frustrating experience of breaking devices has been found to be a common effect of self-tracking devices in practice (Lupton, 2016). For Hilary, part of the frustration regarding broken watches was that the fitness watches also introduced a new way of quantifying 'appropriate' time has been spent on exercise.

The watches also introduced a new rhythm for exercise, which impacted upon how Hilary approached care of her body. In an explanation of why it is frustrating when the watches have stopped working, Hilary mentions:

> "And I'm so used to having it and checking my steps to see that I get 10, 000 steps everyday. Which I don't, but I don't get too neurotic anymore. I used to get really neurotic."

The 10,000 steps became a marker of appropriate self-care for Hilary. When she first got a watch, Hilary was very motivated by the 10,000 steps goal. The watch gave a message of positive affirmation when this milestone was reached. Over time, Hilary has placed less importance in this goal, noting though that she had done a significant multi-day hike recently and had really enjoyed reaching such high targets. Even while she realises 10,000 steps is an arbitrary goal she often does not meet, evaluating herself against this metric has become part of Hilary's care routine. This constituted a new exercise rhythm where 'good care' was marked by a particular number of steps occurring within a particular time period. With her 'old' system for tracking exercise, Hilary would only record specific types of activities carried out at particular times of day (her swim, her exercises, and so on). In contrast, Hilary wears the watch all day. Her movement in non-exercise spaces like her workplace is incorporated into the 10,000 steps. In these non-exercise spaces, Hilary now finds herself conscious of her movement. When this rhythm is disrupted, it is experienced as a destabilisation of care.

The example usefully demonstrates the role that a technology can play in constructing a 'care time'; an orientation toward time that other actors in a care network adopt. The temporal functionality of self-tracking devices goes beyond saving time and offering information about the body that can be used for better self-management (Lupton, 2016). In mediating the self-care routine, new ways of understanding movement in time (Ruckenstein, 2014) are introduced into care networks. New metrics are integrated with a number of pre-existing practices. Understandings of good days of exercise and self-care are re-orientated (Hand & Gorea, 2018). The rhythm of Hilary's care network changed with the introduction of the Fitbit. The way time is accounted for in relation to good care was altered for Hilary. The short lifespan of the devices produced a new and destabilising affect (frustration). Most notably, Hilary's sociotechnical care network reflects the way that the temporal experience of care is produced in multiple, uneven relations.

How care time functions in the context of this example is produced by the interactions of many different actor-networks with their own goals and priorities. Most notably, the profit imperative is evident as a goal shaping how the sociotechnical care network functions. In contrast to Hilary's older system for tracking her exercise routine in notebooks, the new system introduces new actor-networks that extract value from Hilary's data (Neff & Nafus, 2016; Ruckenstein & Schull, 2017). In this way, Hilary's self-care activity can be understood as a form of free labour insofar as it is affectively valuable to her (Terranova, 2000), and economically valuable to Fitbit (Till, 2014). In the Fitbit, walking is re-conceptualised into steps (Hand & Gorea, 2018) and then gamified. Gamification refers to the logic of a game being introduced into a space where it was not previously (Whitson, 2013), in this case, Hilary's exercise log. When 10,000 steps are reached a celebratory message is displayed on the Fitbit's interface. Hilary enjoys receiving this message, it functions like a prize. Pursuit of the prize-as-reward becomes a motivating factor for her to move more throughout her day and to always wear the watch (in the same way that the prize in a game motivates continued play). The practice of gamifying self-tracking cannot be separated from its origins. How a technology works reflects an interplay of distributed agencies. The gamified notifications are made meaningful by Hilary, but their inclusion in the device reflects the types of data that Google (the commercial entity that own Fitbit) wish to generate (Till, 2014). The 10,000-step reward encourages her to use the device in the ways which are most valuable for them. In this instance, that is wearing the watch all day to so that the device can continually collect data. These commercial priorities shape how Hilary's sociotechnical care network functions.

The functioning of the sociotechnical care network is not always in line with Hilary's needs, interests, and priorities. As an older woman, Hilary has a complex, decades-long relationship with her body image. The exercise regime that she developed brought her both pleasure and a sense of control and order (as opposed to a sense of being obsessive about exercise and about how she looks). This equilibrium of self-care was disrupted by Fitbit and the temporalities it introduced. There were negative affective consequences for Hilary when the devices broke, and Hilary lost access to her information. Hilary's notebooks proved to be durable. She still has many of the used notebooks in her possession. In contrast, the fitness watches did not. Hilary does not own the data that pertains to her body collected by the Fitbit. Once the devices broke, she also lost access to her activity records. The introduction of the Fitbit meant that Hilary was less able to manage exercise information through time. Further, in the quote above, Hilary describes being neurotic about her step count. A process of adjustment was needed for

the device to become part of the exercise routine in a way that contributed to care. At first, Hilary's wellbeing was harmed by the device. The focus on the body was experienced as a disordered way of relating to her body. Instead of saving time and automating a care task, the Fitbit introduced an entirely new way of apprehending time, producing a novel time that Hilary needed to adapt to in order to produce care.

The example of Hilary's experience with her Fitbit makes clear the ways that introducing digital technologies can produce complex temporal experiences that shape whether and how care can be achieved. The temporal is an important actor producing care. Time itself is an actor, but so is the way that time is apprehended, made sense of, spoken about, and used. Care often results when things happen at particular times, in particular sequences. Organising time differently destabilises care. As participants integrated technologies into their routines, new care times are produced. New technologies have their own orientations to time inscribed in them, reflecting their materials, design, designers, and imagined users inter alia. For example, a website makes shopping available at all times rather than bounded by opening hours. These temporalities impacted the rhythms and routines of participants in ways that could benefit participants. However, Hilary's example shows one way that care-time can also be destabilised by a new technology. While taking different forms across participants, this was a common occurrence (ranging from the problems using websites to order takeout as a diabetic to the stresses of constant communication enabled by the mobile phone). The sections that follow build on this discussion about complex temporal dynamics, detailing how the temporal orientations of technologies impact care networks.

8.2 Ageing in a culture of speed

Age, and how people understand themselves as an ageing person, is shaped by dominant discursive frames that position contemporary life as 'sped up' (Sharma, 2014), value a fast pace and subsequently devalue the old, slow (Baars, 2015), frail, and dependent (Fine & Glendinning, 2005). An important theoretical distinction at this junction is that while technologies are encoded with particular temporal orientations, this does not mean that time for people and societies with technologies is fast. How time is apprehended and experienced is shaped by dense knots of network interactions between numerous social, technical, and material actors. The previous section explored the way that a temporal orientation of a

particular technology can impact care. This section highlights that the discourses of 'speed up' and 'newness' were significant actors organising relations within sociotechnical care networks. They influenced how participants understood themselves, approached technologies, and created new requirements for self-care. For example, some participants situated themselves in a culture of busyness as busy people, employing technology as a way to manage their time, which was filled with many different activities demanding their time. However, differential experiences of time within culture and within family were noticed by other participants, which necessitated new self-care practices.

A pattern across the interviews was that some participants understood themselves as outside (or at risk of being outside) of the fast culture of younger people. Understanding oneself as positioned in this way was dually consequential for sociotechnical care networks. Firstly, it shaped how participants used and valued technologies. Secondly, it shaped people's expectations of digitally mediated connection as care. Janet's description of what she values about her internet use illustrates the first point. Being positioned on the outskirts of a dominant temporal culture shapes how she relates to the technology she uses. In this quote Janet, explains how time spent online was a way to be in contact with the younger generation:

> "…so I do enjoy the opportunity and things like that to be able to be able to keep up with the vocabulary. And so, while I may not always be able to remember it or use it choose to use it. It is the fact that language is changing and there is quite a lot of either contractions, it's like you know people working in 'hospo' and it doesn't mean hospital. Or the fact that life is so fast that we must bring these words together and be able to create a new image… So it is good for that. Because one of the problems with being older is that you are not having conversations with younger people."

Janet describes here a migration in time where she is living in a culture that is different from the culture she spent her youth in (Westerhof, 2010). This culture has different linguistic habits and a different speed ('fast'). The idea that 'life is fast' is presented as a fact suggests that it is a dominant way that time is apprehended (Sharma, 2014). In talking about her experience of time, she is situating herself partly within this culture of sped up modern life ('we must bring together'). At the same time, Janet situates herself outside of this culture of speed with her assertation that she may not remember or choose to use these terms. More importantly, she positions her lack of conversations with younger people who are situated within the culture of

speed as a problem that she must address. As an older person, she understands herself as particularly at risk of exclusion from this culture.

This example illustrates that one reason that sociotechnical care networks formed was in relation to a culture of speed. For Janet, this was a response to understanding oneself as outside the dominant fast culture. A dominant way of apprehending and making sense of the cultural life with widespread networked, digital technologies is in terms of a culture of speed. The older person who is able to participate in this culture is one who is competent with technologies. Technology use was a way that participants could adapt to and demonstrate their ability to manage within culture of speed. Using the example above to illustrate, Janet values technology use that affords her the ability to keep up with younger people. Her identity as a person able to function in this new cultural context of speed is produced in her relations with technology. Using the internet to visit websites is crucial for Janet to mitigate her exclusion from younger people. It is how she ensures she can keep up with their language. Through the internet she can gain access to younger people that she otherwise lacks in her life, enabling the maintenance of her status as someone who has not been left behind. This can be considered self-care insofar as it is work on herself to maintain such an identity. Key actor-networks that influence how this form of digitally mediated care functions include the discourse of sped up culture, the linguistic forms it influences, and temporal and spatial arrangements that mean older people do not frequently encounter the young.

Time spent online was also a way that some participants negotiated complex identity work related to ageing as a state of decline by positioning themselves as oriented toward the new. While Janet positioned herself outside a culture of speed, for other participants, technology use was a means of appropriate care of the self by using their time and talking about how they used their time in ways that showed they were not declining or slowing down. Being older and slower are devalued temporal states. Ageing presents us with experiences that challenge our sense of self and identity (Wong & Breheny, 2021). Changing health statuses and changing living situations impact how we understand ourselves and narrate our lives. Slowing down is associated with meanings of frailty and dependence that can have negative connotations (Fine & Glendinning, 2005). Identity work is carried out to maintain a positive sense of self as active and independent, as ‘kept up’. These value judgements related to ageing and how to conduct oneself in the face of changes, create imperatives to ‘care’ for the self in particular ways.

Technology use was thus understood by some participants as a measure of temporal 'currency'. It is an activity oriented toward the present and the new.

This is exemplified by how Mitch compared his time use and technology choices to his peers. Mitch is an active user of the internet and strong participant in online political conversations via blogs. This improves his well-being but is also a vital way that he negotiates his sense of self against challenges to his identity as an active and independent person. Mitch is in his late 70s. He spent a lot of time online, which was positioned as something very positive and a marker of his engaged social citizenship. Mitch went as far as describing himself as *living* on the internet in this quote:

> "I live on the internet. It controls email, all the blog sites. I don't watch the main media channels because of their bias and all that sort of stuff. They're no different to the TV and print media and all that sort of stuff."

While Mitch is not living in an aged care facility, he does live in subsidised accommodation provided by a religious organisation. It is designed for older people that are unable to meet their need for housing in any other way. He has a complex relationship with his family (who are based overseas) and does not speak about friends that live locally. Over time, Mitch has had to give up his motorbike and his bicycle. Through the interview, it is evident that living in a small village setting impedes upon his sense of privacy. Mitch also notes that being financially constrained limits his independence.

Meanings associated with supported living shape how people spend their time and demonstrate self-care. For older people, the move into a residential facility is a significant and oftentimes stressful life change that can impede autonomy (Löfqvist et al., 2013), be experienced in negative ways, and feel distinct from their earlier life (Wong & Breheny, 2021). Through our interview, Mitch contrasted himself and his use of time with the other people living in his village. His explanation of how he used his time located his identity and sense of self outside of the constraints of his life and the residential village setting. Through evaluation of how he uses his time in comparison to others, Mitch demonstrated his agency and ability to self-care and keep up. Where other residents mostly spent their time talking, reading the newspaper, or watching TV (activities that are less associated with younger people and 'new' media), Mitch spent his time online via his computer. Mitch does explain that part of the reason he doesn't engage with his immediate community is their differing political views. But he also is

dismissive of how they spend their time. Mitch's peers' passive consumption of media is contrasted with his active, engaged media use. In positioning himself as someone who is very present online and establishing that a lot of his time is spent 'in' this realm, Mitch is demonstrating that he is an engaged, informed citizen who participates *discerningly* in society. Being an active participant in society is a marker of a socially valorised identity (Breheny & Stephens, 2017). Rather than being in a state of passivity, decline or withdrawal, Mitch's explanations of his technology use demonstrates that he is engaged and keeping up with the wider world.

The work on the self performed by older people in preserving a socially valorised identity reflects relations that disadvantage older people. Janet's addendum above that she may not choose to use the language of the fast culture here illustrates the way that many participants did not unquestionably accept the culture of speed as desirable. Yet regardless of such perceptions, it was nonetheless evident that the fast and new culture was something participants had to negotiate. The dominant way of talking about and valuing time use is one that some participants understood as separate from themselves and their lives, necessitating work to acculturate. That some of those participants who didn't automatically situate themselves in a culture of speed nonetheless valued uses of technology that helped them calibrate to it, and that other's felt it necessary to spend interview time establishing that they (unlike other older people) were keeping up, is consequential.

An orientation to time and technology that privileges speed can devalue and obscure other temporal ways of being and relating to technology (Baars, 2015). Further, an orientation to time that privileges the fast has been explained as a way that capitalist networks reproduce through structures that prioritise the experiences of privileged capitalist subjects (including those who work in technology and financial sectors) (Sharma, 2014). This analysis shows that the temporal expectations and norms of younger people are socially foregrounded. The next section argues that these temporal orientations were not always in line with the priorities of the participants.

8.3 "It is a time thief, but also, it fills in time"

A particularity of this temporal experience of older people is distinct and contradictory experiences of time, which impact significantly on care and connection as care. As has been highlighted, being a person who is 'not busy' in a culture of speed can present challenges for the maintenance of a socially valorised identity. Being 'older', 'slower', and outside of 'work' time carries negative connotations. Many of the interview participants were retired. Managing time in retirement was a new task required for self-care, although how this was experienced across the participants was differential based on their health, functional abilities, energy levels, values, and financial resources amidst other actor-networks. Following retirement, the routine of daily life was significantly altered producing a contradictory experience of time. On one hand, there is an understanding of time as scarce; a resource that is finite in older age (Breheny & Stephens, 2017). On the other hand, retirement means that a person who has been in employment now has more hours available in the day. Digital technologies were employed by study participants to manage the challenges these contradictory experiences of time present, contributing to the maintenance of socially valorised identities and valuable routines. In this sense, they are part of more than human networks that achieve care. However, digital technologies also require significant care to work, which was experienced by some as a 'waste' of limited time. These contradictory experiences of time result from the ways sociotechnical care networks are ordered and function in ways that can run contra to the care needs of older people.

No longer participating in paid work (and for some participants, community work) presented a practical challenge for self-care. Put simply, a group of participants who were generally older or had complex health situations had a lot of time to fill in. This is dually consequential. Meaningful activities needed to be found so that having too much time does not negatively impact on well-being. Having too much time also presented a challenge for a positive sense of self. Some participants mentioned that one way that their technology use benefited them was by acting as a 'time filler'. Technology as 'time filler' for older people refers to when there is a block of time in the day in which there was nothing better available to do to, online games, shows, and social media scrolling can offer a means to fill that time (Nimrod & Ivan, 2022). When described in this way by study participants, the time filling ability of technology was valued. Technology as a beneficial time filler was most directly articulated in this study by Vera. Vera is long retired from work. Her family live close-by and visit frequently, although all have busy lives.

She has recently stepped back from coordinating a community group that did charitable work. When I ask what she values the most about her technology use, she says:

> "Ah. Dah, dah, dah. Well it's a great time waster, because actually, I do I do um puzzles online."

That Vera places so much value on an activity she also describes as 'wasting' time speaks to the fact having too much time is a problem for her. She actively seeks activities that will help her to fill in time. While the free puzzles she plays on her tablet could sometimes be frustrating when particular websites ceased to work, the activity was not a 'waste' of time in the most direct interpretation (an activity that had no benefit). It was a 'waste' of time in the sense that it filled in hours of the day. She also used her tablet to access the news as part of her daily routine, a routine which she valued immensely.

Technology use offers a positive solution to the problem of too much time. However, it is not simply that technology use in and of itself offers the solution to this problem. The specify of practices being used (Gallistl & Nimrod, 2020), in this case to fill in time, impacts whether the practices contribute to well-being. Whether or not the time-filling capacities of technology were beneficial connected to specific online practices. Vera, for instance, enjoys doing the puzzles. It is notable that Vera's puzzling is a continuation of an offline leisure practice. When her grandchildren had been small and living overseas, she had used puzzle books to entertain herself on the plane. The children had quite enjoyed doing them with her, and it had been good for their English. Vera also remarked she'd been doing an online puzzle the other evening and her granddaughter (now 16) had joined her. In this sense, puzzles are a form of leisure that she has historically enjoyed and that are linked with meaningful social experiences.

Leisure practices such as this, whether online or offline, are a way that older people can meet their needs (Gallistl & Nimrod, 2020), in this instance for enjoyable activities to fill time. Digital technologies converge many different, disparate activities (reading the paper, doing puzzles, watching television and so on) into one (or more) screen (Jenkins, 2006). As such, they make satisfying the need for entertaining and time filling activities easier. For example, for Vera there is a seemingly endless supply of online puzzles that can be accessed at any time, without limitations such as needing to replace puzzle books. She no longer needs to purchase a newspaper. Digital technologies produce care in this way. Their affordances make accessing activities that contribute to well-being and meet a need simpler.

The small acts of pleasure offered by activities such as puzzling are not isolated events – they are part of larger routines that contribute to care; ways of using time involving digital technologies that meet a real need for enjoyable, stimulating activities. The ability to manage time is meaningful and important in the context of social, physical, and cognitive changes associated with ageing. Retirement means more available time, as well as the cessation of many activities that had previously contributed to a sense of a normal rhythm of life. Similarly, physical changes for some participants lead to a slowing down where activities were cut back. Managing time with technology for self-care went beyond filling in time to creating valued new routines.

This is illustrated by an insight from earlier in my interview with Vera. She explains her morning routine in this way:

> "Well, when I wake up I always put my tablet on and I look at um [local paper]. I go on Stuff and look at [local paper]. Then I look at the other part of it that's NZ news. Look at that. And then I play patience and spider patience (I: on your tablet?) On my tablet yea. And a few other little things there that I use, word find and things. So I probably spend about an hour doing that. And in the mean, as well as that I'm making breakfast, go back and have it. Get some coffee and go back and have it, things like that. So that's. It doesn't seem the right sort of day if I've had to get up early and not open the tablet. But that hardly ever happens."

Vera's media use does not take place in a discrete stage of her day. As Martin (2021) describes, media use is entwined with other practices and materials. Many actors are listed here including the time of day, tablet, a news website and local news website, coffee, food, kitchen (space for making food), and so on. Each actor, when encountered in sequence, contributes towards a sense that it is 'the right sort of day'. When each actor has been translated, and the routine unfolds, Vera's sense of normal time is produced. A new routine has been created to maintain Vera's well-being amidst changes to her life since cutting back on her volunteer activities. Adding a complexity to the discussion of technologies role in acclimatising older people to the sped-up culture described above, digital technologies could be an important actor in the creation of a meaningful, slower routine.

This section and the one previous have discussed different ways of valuing technology use in relation to time use. In each instance, technology contributes toward a sense of time sovereignty. Time sovereignty refers to having control over time and the ability to engage in activities purposefully (Ekerdt & Koss, 2016). The sociotechnical care network can function to produce a meaningful slower routine in a context of slowing down. Alternately, the sociotechnical care network can function to help older people keep up, avoid being left behind, and acclimatise to a culture of speed. While these different experiences have been presented and analysed separately, for many participants these two different orientations to time and technology coexisted. Digital technology was part of important routines for adapting to new temporal conditions associated with ageing (lots of time to fill) as well as offering a way to keep up or avoid decline.

While as discussed above these ways of using technology as a form of temporal labour on the self to acclimatise to faster-paced culture, in these discussions participants nonetheless used technology for facilitating a *control* of the temporal conditions of ageing. Participants were able to build sociotechnical networks that contributed to their wellbeing (even while themselves being translated in line with the interests of other actors). This control contributes to care, the maintenance of the conditions necessary for participants to meet their varied psycho-social needs – for an enjoyable way to pass the time, for routine and a sense of normalcy despite life stage changes, and for a valued social identity. However, this was not always the case. In two important ways the functioning of sociotechnical care networks also reflected a lack of control on the part of participants. Firstly, patterns of contact could be set by younger family members based on their pace, to the detriment of their well-being. Secondly, technology could also erode time sovereignty for participants – by acting as a time thief.

The intersection of a broader cultural orientation toward speed (manifested within families as 'busyness') and the daily rhythm of the older person (with additional hours to fill) did in some instances have implications for whether and how digital connection was experienced as care. One way that this manifested was through temporal arrangements where people within older peoples familial and social networks are too busy for frequent in person contact. For a small number of participants, the busyness of others also impacted upon the frequency and quality of mediated connection as care, impeding the extent that digital connections contributed to wellbeing. It was significant that even with the two participants for whom this seemed to be most impactful, this was framed in terms of gratefulness for any contact. The busyness of

others was presented as natural, as a taken-for-granted fact. This is highlighted in Beth's descriptions of her familial contact and her feelings about it. Beth situated herself and her daily life outside of the temporal culture of younger family members and spoke of how their busyness impacted her. She would like to be more in contact with her family, none of whom live in her city, but she noted that everyone is "so busy". As time passes, this is getting worse for Beth.

Beth's experience highlights both the dense network of temporal actors within digitally mediated care and the work that 'busyness' does in naturalising particular social arrangements. In this quote, Beth locates one of the reasons for a lack of contact within familial changes over time:

> "we used to skype all the time but now the girls are older. Coz (granddaughter) is nearly 11 and (granddaughter) is 8. They are not so interested now. I mean, when they were little they used to kiss the screen, coz they thought they were kissing me, you know. And I used to go there twice a year. But now they are older they are just not. Just a quick hello, how are you sort of thing? And then those things where you can do things with your face, they do those. But I did it. Um. And I couldn't get rid of it! So I had to hang up and ring back again."

As Beth's granddaughters grew up the way that the family has communicated has changed. Her family in Melbourne's routines have changed. As this quote highlights, Beth needs to keep up with the different technologies they use as they go through different stages. Further compounding this, at the time of the interview, COVID had drastically limited travel. There are many temporalities in this sociotechnical care network that impact upon Beth's experience of connection as care: the Melbourne families routine of work, school, and activities; the granddaughters' changing orientation to family time; and the curtailing of 'normal' activities during the COVID pandemic. The impact of these temporal actors on Beth was a sense akin to being 'left behind'. Beth deeply appreciated the contact that they did have, recognised her son in Melbourne's professional job, and valued the work her son and daughter-in-law did to ensure that Beth was connected. The busyness of her broader family and her granddaughters increased age were linked by Beth in our conversation. The busyness of the family was presented as given, an unquestioned fact. Beth experienced her life as being out of pace with a natural order of family life. This impacted upon connection as care, insofar as the frequency of casual connection was less than Beth would like.

The understanding of busyness as a self-evident fact of modern life impacted upon care for some participants. Digitally mediated care provides a way for families and social networks to manage a care responsibility by lessening the need for face-to-face informal care provision. Beth's experience illustrates the way that busyness can provide explanation and justification for levels of digitally mediated contact that do not fully meet social and emotional needs of the older person. It is not that busyness is necessarily an excuse to avoid care. Rather, the discourse of speed up makes expressing that digitally mediated care is inadequate difficult. It provides a 'ready-made' and unchallengeable explanation for infrequent contact. Framing time in terms of speed up is productive insofar as it is a discursive actor which organises relations so that a need for social contact is framed in terms of, as Mitch put it, "just good to get something back". The notions that 'modern life is fast' and that 'busyness is natural' are actors that influence how digital care networks function in ways that can impede upon care of the older person.

The unmet need for contact of older people creates the temporal conditions for those in their families and social networks. If the older person waits between instances of contact, the other has more time to dedicate to activities other than the informal social care of the older person. These differential experiences of time reflect that how sociotechnical care networks of older peoples are organised and function, in part, are shaped by political-economic actor-networks. Younger people need to balance social reproduction (including care of children and older people) with employment responsibilities and the waiting time of the older person makes this care work easier. The various ways that a fast, busy culture is experienced by participants, taken together, speak to a temporal power dynamic of digitally mediated care, where older people must work to acculturate to a temporality set by others, regardless of their priorities for care.

Technology could also erode time-sovereignty by wasting the time of participants. Using digital technologies was either specifically mentioned by participants or described by participants in ways that suggested it was very time intensive and took up *too much* time. This not only eroded time sovereignty but was at times unenjoyable and frustrating, detracting from the kinds of benefits described above. In the paragraphs that follow, I will discuss one aspect of this, specifically the work that goes into making technologies usable (the relationship between content and time will be discussed in the next section). This work included things like

updating technologies, setting up new technologies, managing passwords, organising repairs or replacements, finding ways to use technologies that had issues and so on. It is notable that some of the participants enjoyed *some* of the aspects of this care work. Generally, the enjoyable care tasks related to extending the life of or setting up devices. For example, Beth and John had enjoyed fixing broken devices. Mitch and Keith really enjoyed tinkering and making things work for them and their needs. This kind of care work for devices created resourcefulness, independence, and socially valued skills.

However, most participants found that at least some aspects of this kind of care and maintenance work was not time well spent. In these instances, the 'problem' was not so much connected to the skill of the participant but more arose from the way that technologies themselves worked. This quote from Alan is particularly illustrative of this perspective that some such work can feel like a waste of time. For context, Alan (early 70s, recently retired) recently purchased a television and found the process of setting it up to be quite intuitive and straightforward. This was quite novel, and he was appreciative. His general experiences of getting technologies set up and working were much more negative. Even though he considered himself to have a decent level of skill (despite some admitted 'cock-ups' from time to time), setting up and maintaining technologies was from his perspective a laborious, long process. As he explained, this was a problem because:

> "I think that time is the one thing I can't replace. You know money and all these other things I can replace. But time I can't, you know. Because He has only given me so many weeks, months, years left [alive]. I don't know…"

In this quote Alan describes a particular orientation to time, as a finite resource that has been gifted to him. When time is experienced as something scarce, it is felt as something that needs to be carefully preserved and that can be 'wasted'.

The notion that time is akin to currency is not specific to older people but a dominant way of making sense of time in late-capitalist cultures (Baars, 2015). There is an affective character to this for older people specifically, as is exemplified in Alan's description of his experience of time. Alan presents time here as a finite, God-given resource. Getting set up (and for other participants, needing to update, manage passwords, replace devices and other such work) necessitated an investment of this time. This time, from the perspective of participants, is time that could have been better spent in other ways. Time takes on a particular significance in older

age, and the sense that time is being wasted has emotional weight. Being proximally closer to death focuses attention on the things that matter to a person (Carstensen, 2021). More than a simple frustration, some aspects of technological care are experienced as an unwanted detraction from what really matters. Caring for technologies takes away time that could be spent contributing to well-being and a sense of life satisfaction.

Ageing and being older are characterised by particular, divergent experiences of time which intersect with the unique temporal orientations of digital devices, impacting on care. When the time sovereignty of participants was eroded in these relations, care was harder to achieve. Yet having a sense of control over time does not always reflect network relations that are empowering for older people. A dominant temporal orientation is inscribed into devices and the functioning of digital technologies shape a broader temporal order. An inclination toward speed and busy impacts how participants structured their device use and made sense of connection of care. Sociotechnical networks could produce a care time characterised by meaningful slower routines. However, participants also undertook significant labour in order to keep up. While saving time was often articulated by participants as a benefit that technology offered regarding care, this section has highlighted that the temporal implications of digitally mediated care are in practice complex and contradictory.

These frustrations and temporal tensions again reflect network dynamics where older people's needs are not a priority in network organisation. The need for the investment of time in maintaining technologies through updates and setting up new technologies is a product of strategic design choices. The continual need to update, for example, is a commercial strategy on the part of those selling devices and software programmes. The time-consuming work described here that is necessary to maintain sociotechnical care networks is ultimately arbitrary insofar as it is not inherent to digital care networks, rather it is a feature of how digital technologies are currently designed and produced. In this way, temporal tensions speak not just to the way that sociotechnical care networks that older people rely on are arranged in ways that benefit younger family members, but also to the implications of digital networks built by technological companies that prioritise profit derived from a cycle of continual upgrades. The next sections explore the way that commercial decisions impact older people further, focusing first on the way that *the content* on digital platforms can erode time sovereignty before moving to a discussion of the ethical implications of short-lived technologies for older people.

8.4 Managing time online as a self-care imperative

Engaging with content on social media was a notable and specific manifestation of the 'filling time' versus 'taking time' contradiction. Many participants expressed a need to negotiate between being appropriately socially connected and up to date regarding current affairs and spending too much time online. Spending too much time online was linked with meanings related to dependency, wasting time, and a lack of control over one's time. Too much time online was equated by participants with a failure to adequately self-care.

This can be usefully illustrated through a discussion of the rabbit hole metaphor two participants used to describe what spending too much time online looked like for them and how they managed it. Corrina explained:

> "You get down a rabbit hole with these things. You'll be on Facebook and there will be a hyperlink, or you will be on the Radio New Zealand website and there will be a hyperlink to something else. And then it is 2 o clock in the morning, and you are fascinated reading this incredible scientific thing where the words don't mean anything but I'm reading it!"

And Daphne used the term in this context:

> "If I'm having breakfast and scrolling through the emails, then that kind of morphs into seeing what the notifications are on Facebook. Some of them I don't bother with, I don't even open them. Yea. I'm just not interested. Others I do. Time is a huge thing. You know you end up down rabbit holes".

Each participant is expressing the way that their time can be lost online. The women described a phenomenon here where when they are browsing on social media or other websites, technical features such as hyperlinks and algorithmic 'suggested content' features make it possible to continue browsing other content. Since the content is effectively endless, knowing when to stop becomes difficult. The rabbit hole as a metaphor has different connotations. It can suggest being engrossed in an interesting or surreal topic, being lost amidst useless information, or becoming engaged in conspiratorial content. In any case, going down the rabbit hole is time consuming. The rabbit hole phenomenon is a very specific manifestation of a broader concern about the ability of technology to erode a felt sense of control.

Daphne and Corrina both got some enjoyment from the content that they engaged with on social media, but found it also eroded their time sovereignty. In Corrina's account, the content that she viewed was described in very positive terms like 'fascinated' and 'incredible'. However, she also noted that the words she read did not 'mean anything'. The content she engaged with was not adding to her personal stock of knowledge or building to a greater understanding of a particular topic. Daphne describes a process where one task morphs into another as she follows links of interest. She acknowledges that some of the content is uninteresting and not worth engaging with. For these two participants, social media could be a site of pleasure. Yet for each woman, associated with the 'rabbit hole' was a sense that their control was lacking.

Both women had specific strategies that they employed for managing their time online to try to avoid being down rabbit holes. Corrina explained that she has her phone:

> "… set up in the settings so that it doesn't ring or do anything between 11 at night and 6 in the morning. That's part of training myself to not fiddle with it or to not sit up all night reading it or doing things."

Daphne's management strategy was to be conscious about not using social media outside of the house, limiting the time she spent on social media, and restricting the places in her house she looked at her notifications. What is particularly significant here is that in the stories about rabbit holes told by Corrina and Daphne, representative of a broader pattern in the data as a whole, there is both a sense of a lack of control over time related to social media use and a responsibility to engage better time management practices. Even while technical features are mentioned (hyperlinks, notifications) and concerns were expressed about Meta, it's founder Mark Zuckerberg, and the politics of social media, too much time on social media was generally understood as a poor self-care requiring intervention.

The experience of losing time online described by participants is produced in the interactions between participants, discourses that shape how time is understood and valued, the materiality of their devices and platforms, as well the political economy of social media. In the participants recounting of their experiences some of these associations are revealed. Facebook is a complex actor-network with its own temporal orientations. Materially, Facebook is characterised by many technical processes, which happen at scales and speeds not registerable to human users (Bucher, 2012). Corporate social media platforms collect and analyse vast amounts of data and

filter vast amounts of content, in ways that would not be humanly possible. The interface has been designed to make navigating to, through and staying on the site as easy as possible (Stanfill, 2015). When Corrina opens the Facebook app, for example, she arrives onto 'Newsfeed'. From there, all she needs to do is scroll to be presented with an endless stream of content that she can click on at will. Her own interests interact with technical processes, producing the rabbit hole experience. Using the site in this way can be considered the normative design of the site, the "path of least resistance" she can take in navigating the interface (Stanfill, 2015, p. 1061). Facebook also 'nudges' users into particular actions through notifications. As Daphne details, she encounters a number of notifications displayed by Facebook both inside and outside of the platform. As she chooses which to follow, the rabbit hole experience is produced. The time users like Corrina and Daphne spend on Facebook is never just time for leisure or social connection, it is "productive time that generates economic value" for Meta (Fuchs, 2015, p. 93). This speaks to 'free labour' (Terranova, 2000) more broadly, where older people's social media use is simultaneously enjoyable and economically exploited.

The sense of lost time ultimately creates a requirement for individualised self-care on the part of participants. There is a tension between the enjoyable aspects of social media and an unnerving sense of a lack of a control over time. This sense undermines the identity position as a person who uses their time purposefully. From the perspective of participants, the implication of lost time is that it creates an imperative to undertake better self-care, through the conscious monitoring of time. In attributing all the responsibility for time management to themselves, this chain of translations, and the powerful corporate entities that act as network builder are elided. In this sense, the responsibilisation of time can be understood as a continuation of neoliberal modes of governance of the self (Katz, 2000). The actions of corporate and market actors are obscured, and the responsibility for care is placed with individuals and, contentiously, their families.

This section has shown how the different temporalities of sociotechnical actors can interact to erode time sovereignty, compelling individuals to take responsibility for their time online as a self-care care practice. The next section builds on this further, exploring how adult children as well as some of the largest providers of corporate social media and digital devices played a significant role in structuring what 'good' looks like with regard to digital habits in ways that can devalue the temporal practices of older people.

8.5 “I’m an addict. So are you!”: Devaluing the ways older people spend time online

Value judgements about appropriate and unhealthy ways to engage and relate to technology shaped how participants organised their sociotechnical care networks and rhythms of selfcare. That time sovereignty was linked by participants to good self-care through a sense of proper, normative use of technologies was evident in the interview data. Two significant actors with a particularly important role in defining proper use of technology were adult children and technology companies. The assumptions, priorities, and norms that underpinned value judgements about ideal ways to spend time online did not always reflect the needs and use patterns of older people.

The disjuncture between socially valorised healthy ways of device use and that of an older person was especially evident in Vera’s sociotechnical care network. Vera was interviewed with her adult daughter Jennifer present. Whilst Jennifer was not ostensibly involved in the interview, she often commented on what Vera was saying. When describing her daily routine, Vera observed that each morning she spends about an hour on her iPad, looking at news websites and playing various games while she is making and eating her breakfast. Straight after this comment, Jennifer interjects, “So you are an addict?” Vera responds “I’m an addict. So are you!” before quickly changing the subject to discuss wanting to get rid of her landline. Later in the interview, as Vera is speaking more about the games she plays, Jennifer laughs and again remarks “See! You are a gaming addict”. When we are talking about how Vera uses Facebook to look at the profiles of people she has friended to see if they have posted anything new, but rarely comments, Jennifer remarks that Vera is a ‘lurker’. Whilst Jennifer’s comments appeared to be light-hearted teasing, it nonetheless frames the way that Vera is using technologies as aberrant, implying that Vera spends too much time using her iPad in the wrong ways. Vera’s everyday practice of maintaining a rhythm that is meaningful to her is reframed by Jennifer as unhealthy through the invocation of addiction.

The term addiction has a moral encoding as something bad, a failure to maintain proper control of the self. A full analysis of the complex ways the meaning of addiction as coproduced by lay and scientific institutions such as the media and medical researchers (Winter, 2016, p. 40), as well as technology companies, is beyond the scope of this thesis. What is significant though is

the way that Jennifer's joking polices Vera's use of time mediates ideas about good and bad use of time online. The potential humour here is that Vera could be said to be an unexpected gaming addict. Being a gaming addict is more commonly associated in popular discussions with young men than it is with older women, although there is some academic literature that describes problematic, addictive internet use in older people (see, for example Rosell & Vergés, 2020).

In this instance, Jennifer's use of the term addict does not indicate that Vera's internet use is harmful. It does position Vera's device usage as a reflection of her lack of time sovereignty. Rather than engaging purposefully and appropriately in games and news, Vera's time online is considered too much. Similarly, calling Vera a 'lurker' implies that Vera's social media use deviates from an expected norm of more active contribution. The term 'lurker' has connotations of a user that takes from the community without 'giving back' (Jenkins et al., 2013). It reflects a hierarchy of online participation where using 'voice' online is constructed as the most desirable use, even while 'lurking' is a common practice (Crawford, 2011). The frame of 'lurker' rhetorically constructs the older person as a 'digital immigrant' (Prensky, 2001) who is out of step with digital culture. In offering a critique of Vera's technology use, Jennifer reflects broader discourses related to technology use. The danger of too much time online is widely discussed in the popular media. Smart phone addiction is a societal concern.

The practices of large, corporate technology providers have been subject to intense public scrutiny in recent years, and as a result they are now a significant actor in framing healthy media usage. Following the 2016 US election, the design of Facebook in particular has received considerable public attention. In this context, large corporate entities like Apple and Facebook have entered and even led conversations about what 'too much time' or 'bad' time online looks like (Baym et al., 2020). In a study of Facebook's public statements related to user wellbeing and social media, Docherty found that the company have constructed a binary between good use (actively interacting with other people) and bad use (passive consumption, scrolling through content) (Docherty, 2020). As discussed above, technological companies aim to direct users' behaviour within their architecture in particular ways, by encoding a path of least resistance as well as through notifications and algorithmically tuning the flow of content they encounter.

Assumptions about good and bad use are 'built into' the functioning of Facebook, through functionality such as newsfeed design (how content is ordered and displayed to individual users) or notifications to encourage social behaviours such as liking or commenting on other's statuses. Ultimately, ideas about well-being and 'care-full' use map closely onto the sorts of activities that are most economically beneficial to corporate technology providers (Jablonsky et al., 2022). These ideas influenced how Jennifer approaches her mother's technology use.

This construction of good and bad use of time online is consequential for older people, who may use social media and other technological products in distinct ways due to circumstantial factors. Vera, for example, had more time available now that she had given up her volunteer work. Her gaming helped fill this time in. She did not always feel comfortable commenting on or reacting to Facebook posts. In part this was because younger friends of hers had bad experiences with 'brutal' responses. But she was also friends on the platform with children of her friends. She liked to see their photos and keep up with her friends' wider families but felt commenting in this context would be inappropriate. She got enjoyment from this way of engaging with technology – it produced a sense of well-being for her on her terms. Jennifer's comments, regardless of how playful they might be, attempt to translate Vera into a role of good user. This version of good user who actively comments or reacts rather than just looks ultimately benefits Meta (Jarrett, 2014).

The point here is not to absolve corporate social media of their responsibility to the wider community, but to highlight the way that in this context, a meaningful form of social connection was recast in negative terms, as lacking and aberrant. For some older people the passive process of scrolling and consuming content is enjoyable. It can carry fewer social risks than active uses such as commenting on posts. Crawford (2011) argues that lurking is akin to listening, a politically important counter to 'speaking' online. Yet, the effect of good and bad framings of social media use (and of other applications of digital technology more broadly) is that the strategies older people are employing to manage their complex temporal reality become flattened and cast as bad self-care. Because these framings are mediated by other discursive actors that shape the lives of older people, the connotations of passivity are particularly undesirable. This engenders new forms of labour on the self in the form of appropriate maintenance strategies.

8.6 How the timescales of technologies impact upon care

The chapter so far has highlighted how the temporal orientations of technologies impact upon how sociotechnical care networks function for older people. The final section considers how technologies themselves age and the attendant affective and ethical implications. One frequent observation made by participants about their sociotechnical care network was that the technology they used aged particularly quickly. Technologies becoming old, dysfunctional and then obsolete was common. As this technology aged, it no longer did what it was supposed to do. This was problematic for care at the most basic level, because when a device no longer does what it is supposed to, care can be destabilised. This occurred in the sociotechnical care networks I studied in two different ways: by preventing mobile communication and by preventing other activities carried out to maintain health and wellbeing.

Preventing mobile communication was an outcome of technology ageing that destabilised care networks. All participants except one had a mobile phone. The mobile phone played a particularly important role. Knowing that help was instantly available, particularly from adult children, in the background in the event of an adverse event was valued immensely. Similarly, adult children actively encouraged their parents to use a mobile phone to maintain ambient copresence (Madianou, 2016).

A comment from Daphne, who has an iPhone 6, illustrates how an ageing technology could destabilise care routines. She explains that the phone is:

> "…starting to complain about things. Like dropping off [phone calls], you know, [telephone] connections. And it doesn't always do what I want it to do and it won't always be supported for much longer I don't think either."

Daphne goes on to explain that in terms of the apps on the phone, it can do everything she needs it to. The core problem with the phone relates to its communicative abilities – messaging and phone calls. It is no longer reliable *as a mobile phone*. The exact reasons for why this might be (from a technical perspective) are not clear in the interview or in my observation of her using the phone. But it is nonetheless problematic. For Daphne, the mobile phone is her "connection to the outside world". She does not have a landline, so it is the only means she has to contact her daughters quickly and from anywhere. In the years since Daphne's husband passed away, her daughters are her primary source of practical and emotional support. In an

emergency, she could not rely on the phone to connect her to support. Daphne's description is illustrative of a core reason that technologies were retired: they no longer reliably performed their role as communicator. Participants spoke about the different ways that ageing technologies would destabilise communication including dropping calls, preventing text messages from being sent, ceasing to offer notifications and so on. Many participants lived alone and/or had mobility or health limitations. The mobile phone plays a particularly important role in care because of the ways it connects people to help, making living in their own home and going out into the community feel safer. When the mobile phone ceases to work, care becomes harder to achieve.

Changes to the type of technologies available for communication and their functionality destabilises care networks. As newer models of mobile phones continually become available on the market, older models are no longer supported. The problem for communication caused by ageing technologies is true not just of devices (the mobile phone) but of broader switches in the technological infrastructure used for communication, with implications for care. This is evidenced by the phase out of Aotearoa New Zealand's copper phone network. The copper network conducted electricity, so did not require power to work. In contrast, mobile phones, like cell towers and in-home Wi-Fi, require electricity to work. In an emergency situation such as a storm, even a fully functional mobile phone cannot be depended upon. This highlights more broadly the way that sociotechnical care networks are rendered temporally unstable by ageing technologies. Participants could not have confidence that particular sociotechnical arrangements would endure in the longer term.

Changing technological infrastructures and changes to the types of technologies that were required for everyday life had broad implications for participants sociotechnical care networks. A further issue linked to the changing communications infrastructure is that the purpose of the mobile phone in care networks has shifted. Contemporary mobile phones do not just offer mobile communication. The capacity of smart phone operating systems to host self-contained software packages has meant that these apps have come to mediate an increasing number of everyday life processes (Kitchin & Dodge, 2011). A change in technological infrastructure is occurring where having a model of smart phone capable of hosting apps is increasingly a requirement. Smart mobile phones were used by participants managing health and wellness via apps. Ageing phones do just disrupt communication, but a range of other health and wellness activities.

An experience from Geraldine illustrates this. Geraldine found that the COVID pandemic presented a unique and distinct time in which the technology required to participate in everyday life changed and an existing technology became unfit for purpose. The age of Geraldine's phone became particularly evident during the time of COVID crisis. As discussed in the first chapter of the analysis section, a core reason for purchasing the new phone was that Geraldine's cell phone coverage provider did not offer good reception – she was unable to make connections. However, a further factor complicating this was that the operating system of her old phone was not able to download the COVID tracer app. Until COVID, the use of apps on her smart phone was not a part of Geraldine's day to day routine for caring for herself and her family. Despite an upgrade by the government to the app in late 2020 that expanded the range of older operating systems the app would work on, Geraldine could not download and use the app on her existing phone.

To achieve care, participants had to find ways to adapt or manage the change in conditions caused by changing technologies and techno-social infrastructures. As older technologies were retired, new technologies needed to be bought and integrated into existing care routines. Whether and how changing 'technologies' impacted care also depended on 'social' conditions. In Geraldine's case, the management of COVID risk was mediated by the COVID tracer app. The changed circumstances that resulted from the COVID pandemic meant that the existing sociotechnical care network established by Geraldine became inadequate for ensuring her health and well-being. In this instance, the age of a particular technology mattered, but only because there was a change in conditions. The app was a core part of the early public health response made in Aotearoa New Zealand. As an individual, participating in the community in a healthy way now meant needing to have a smart phone capable of hosting the app. With the virus potentially circulating, the best way to monitor COVID exposure and respond accordingly was via the app. For Geraldine, adapting her sociotechnical care network involved purchasing a newer smart phone. The example raises two key analytic issues. Firstly, it highlights one aspect of the work that participants had to do to ensure their sociotechnical care networks were functional. Secondly, this example shows that the process of a technology ageing, like the process of human ageing, is not simply a 'technical' reality. Nor can it be attributed solely to other 'non-human' factors like the virus, 'political economic' factors like the profit motive, or 'social' factors like the public health response. The technological ageing that impacts upon care is produced in the interactions between these actor-networks.

Obsolescence is a particularly important factor in the device ageing that impacts care. While obsolescence is relational and not something that resides solely in one discrete object (Ståhl et al., 2014), political economic and social actors are influential in shaping the conditions under which a technology becomes unusable (Sterne, 2007). Obsolescence can be absolute, functional, planned and/or perceived. Absolute obsolescence is where a technology does not work at all (Inghels & Bahlmann, 2021). Functional obsolescence describes situations where a technology can no longer perform its intended task, either because of introduced software and/or features that are not compatible with older models, or because of irreparability (Hennies & Stamminger, 2016). Planned obsolescence is where a manufactured goods useful lifespan is artificially limited to drive repeated consumption (Slade, 2009). Perceived obsolescence encapsulates the tactics employed to make technologies seem obsolete, often communicated through marketing campaigns, and including changing the appearance, design, or functionality of a product (Pope, 2017; Spinney et al., 2012).

Each of these different kinds of obsolescence affect the functioning of care networks. Planned, absolute, and functional obsolescence often necessitated the requirement to purchase a new device which, as has been covered in this research, can be a stressful, time-consuming endeavour. Perceived obsolescence seemed to more directly affect adult children, who in some cases made decisions about when a device was too old for their parents. Obsolescence did not just make it harder for participants to communicate and maintain their health and well-being, it also presented a significant challenge in and of itself.

Caring for ageing technology and making decisions about when to dispose of an ageing technology presented participants with practical and affective challenges. Many participants avoided needing to do so. Particularly illustrative in this regard was Janet's discussion about her old laptop. Janet had observed in 2015 that despite still working okay generally, her laptop was "getting to the end of its useful life" and didn't have the capacity to perform all the tasks she needed it to. As such, in conjunction with her daughter (who was also purchasing a new laptop at the time), she made the decision to purchase a new one. However, upon purchasing the new laptop, Janet did not actually use the new laptop for a year. She explains her feelings about this:

> "The terrible thing about technology is it's not like shoes where you can wear them 'til they wear out. The machine itself [was] absolutely fine for what it does. But the software and the demands of life out there mean that you're required to do things on it that are not, you know, that weren't even thought about when it was built… I mean I'm a gardener and I grow plants. And so the whole environmental sustainability thing is something which is really important to me, you know. I'm very happy wearing second hand clothes and all kinds of things like that. And everything has to do to two or three jobs and if things don't they don't get binned, they get recycled, reused. I work in an op shop and so the whole ethos is about making something last as long as possible and doing as much as you can with it."

The sense that a technology is 'ageing' is not produced solely by material reality (the device still works), but in interaction with other actors. Janet makes a distinction between different types of goods. A shoe can be used (and with some styles, repaired) until the materials have degraded to a point where it no longer serves the original purpose as a foot covering. While there is variation across styles and materials, the differences between a functional older shoe and a newer shoe are largely aesthetic. In contrast, new laptops with markedly differing functionality are continually released. Changes and advances in aspects of the laptop such as computing power, storage, and operating systems often occur with newer models. The new capacities eventually become an actor shaping what it is expected a laptop will do and how the processes of everyday life are carried out. As discussed above, this has practical implications for care. However, obsolescence also had emotional consequences for participants.

For some participants there was a tension between the ethic of care they had toward consumer devices and their own care needs. Many participants resisted perceived obsolescence in particular, using things until they were no longer functional. Yet a desire to use goods for as long as possible came into conflict with the fact that older devices destabilised care by making communication and activities related to health and wellness harder to achieve. Janet's example is illustrative of a broader sense that to throw out a discarded device is the wrong way to relate to goods and the environment. Janet describes an ethical orientation to the material goods that she is in association with. This ethical orientation shapes how she cares for them, finding ways to prolong their usefulness. While the laptop still had some functionality to actually dispose of it was counter to how Janet liked to relate to consumer goods and the world around her. To stop using the laptop felt wrong for Janet. Closely linked to this tension was a reluctance to dispose of consumer devices. The sense of 'wrongness' was borne for some participants out of a

concern for the environment and for others from a sense of frugality (consumer devices are expensive items and to dispose of them carelessly is wasteful). Some participants kept their older devices for their grandchildren to use, making use of their limited functions (for example, for games) or to use as toys (for example, as pretend phones). Other participants felt very strongly about using eWaste recycling schemes, in the hope their device would get a second life. Reflected in here is a tension about which forms of care should be prioritised.

The kinds of sociotechnical care networks that have been described are transient *by design*. The profit motive compels large technological companies like Apple to engage in practices of continual updates to hardware and software to maximise consumer purchases. The production and disposal of these devices has deleterious social and environmental impacts. There is significant spatial and temporal separation between the people and places involved with the production, infrastructures of running, and disposal of digital technologies (Taffel, 2016). For the most part, the extractive, labour, construction, and disposal practices that make and unmake the digital devices involved in the sociotechnical care networks I studied are invisible to those being interviewed. Janet's discussion of her reluctance to stop using her laptop speaks to the fact that consumers are not completely unaware of the enduring harms of consumer technologies, but spatial and temporal separation means that this knowledge is mediated and transformed by the technological companies responsible for these processes. Those producing technologies are well aware of consumer concerns and incorporate discourses of sustainability into their products as a strategy to ensure continued consumption (Vonk, 2018). At the same time, digital technologies are essential to ageing in place and for care. Complete non-use of was not a viable choice for anyone involved in the study.

Obsolescence, and the short useful life of digital devices, is an experience that could not be entirely avoided by participants but was managed through a particular subset of practices of care for devices. Given that other companies producing hardware have largely followed Apple's practices (with very limited exceptions, such as Fairphone who create more socially and ecologically responsible phones) (Taffel, 2023), there are few options for participants in terms of choosing an ethically made device. This kind of care involved practices such as keeping a device permanently on the charger or doing without apps that had once been useful. Perceived and functional obsolescence were resisted through these care practices. These acts reflect participants attempts to build a different kind of care network, that creates a balance between their needs (for health, security, and communication), their values, and the needs of

other human and non-human actors. These practices were distinct from the care necessary to get devices to work. They are focused on extending the life of devices as a way to reconcile a care tension. Nonetheless, successful translation to achieve this goal was often short-lived.

This tension is compounded by the fact that sociotechnical care networks are not temporally linear. Care networks are already fragile – requiring heterogenous actors to continually align and hold. Obsolescence acts as a destabilising actor. Obsolescence does not occur at a single point in time, but at many differential points, with different technologies having different effects. Consequentially, care networks are rendered even more fragile.

Older people's sociotechnical care networks are part of much larger consumer technology networks which are exceptionally extractive and harmful over a vast timescale. To apply an idea from Latour, the technologies involved in the network were made using materials that formed over millions of years, were assembled a comparatively short time ago and have a comparatively short useful life, and even when dissembled have a material presence that remains millions of years after (Latour, 1996; Parikka, 2013). These processes cause cumulative harm to environments and peoples that persists through generations. "If one attempted to draw a spatio-temporal map" of the process of obsolescence "one would not sketch out a well demarcated frame, but a convoluted network with a multiplicity of highly diverse dates, places and people" (Latour, 1996, p. 231). Care and self-care for the older people involved are generated in sociotechnical networks, but so too are significant temporal inequities. This is true when looking at the networks of individual older people, but as the actors are followed in the convoluted networks that produce this care, it is clear that people and places are harmed in uneven ways.

8.7 Conclusion

This chapter has mapped the complex, multiple, and contradictory times of sociotechnical care networks. Digital technologies offered participants a new way to manage time, but also introduced new power dynamics, new forms of labour, and new ways that ageism was enacted. The temporal orientations of devices, the 'culture of speed up' that privileges the most valuable capitalist subjects, and the preferred modes of using social media all show how the temporal realities of older people and their needs can be deprioritised in sociotechnical care networks.

Together, these different temporal aspects reinforce a point made across the analysis: how digitally mediated care functions for older people is not always in line with their needs or priorities. Echoing the other analysis chapters, the needs of adult children, states, and technology companies are important actors structuring sociotechnical care networks at different locations and in different ways. In these network interactions, care is rendered harder to achieve for the older person. New responsibilities are attributed to the citizen that is 'ageing well'. They must continually connect for their social well-being and to maintain their independence. They must use digital technologies to maintain their health to avoid becoming a burden on adult children, while also taking care to ensure that they are not spending 'too much' time online. The next chapter explores the form of citizenship digitally mediated care enacts further.

9. Connected Older Citizens

In a culture of connectivity, establishing and maintaining connections with digital technologies *is* care. Creating and maintaining connections between older people and others with digital technologies enables practical and affective support. A core concern for a number of actors is establishing older people's connectivity by setting them up with digital devices. For older people themselves, maintaining connections with digital technologies makes independence possible. For adult children, encouraging a parent to use digital technologies in particular ways can alleviate the burden of informal care. For medical providers, establishing older people's connectedness is constructed as creating empowered patients and lower administrative costs. For states, encouraging digital device use in older people is a way of individualising the responsibility of care of the older person in the context of the ageing population. For social media and other technology providers, establishing automated forms of connectivity between older people and a host of other actors including other people, websites, things, and spaces is a commercial endeavour.

The analysis chapters identified different ways that establishing and maintaining these versions of 'connectedness' was linked with normative versions of good care. At the same time, each chapter highlighted the complexities and tensions inherent in digitally mediated connection as care. The first analysis chapter showed how connection with others via digital technology functioned as care, offering both affective and practical forms of support. Yet being connected with digital technologies was a way that the responsibility for well-being was devolved to families and individuals. Connections were shown to be unstable, moralised, and at times demanding for older people. The second analysis chapter argued that managing connections between devices, people, institutions, spaces and other actors constituted 'good' digitally mediated self-care that marked independence. Being independent is characterised by particular kinds of legitimated, invisible dependencies. The desire to be independent shapes how technologies are used and valued in sociotechnical care networks. Conversely, ways of using technologies that connote dependence are devalued.

The third analysis chapter highlighted that establishing connectivity between older people, devices, and medical professionals is imagined as enabling flows of health information in ways that empower older people as patients. The discussions in the chapter made evident a significant tension between the imaginaries and realities of digitally mediated care. When

technology is posited as a solution for care in ageing populations, it is positioned as something that can be bought 'under control' of the older person and/or the person with care responsibility. A recurrent dynamic across all the analysis chapters is that in the lives of older people, how digitally mediated care functions is often shaped by the needs of other actors. The rhetorical framing of digitally mediated care as offering 'social connectedness', 'independence' and 'empowerment' can have the effect of obscuring that the ways for older people, connections are arranged in ways that often benefit commercial actors and state actors.

The fourth analysis chapter further emphasises the complex power dynamics of sociotechnical care networks by exploring their temporal dimensions. On one hand, the chapter argued that that establishing connections is a way that the temporal realities of being older can be realised. Digital technologies are a key actor in the production of care by offering a way to save and to fill in time. Valued ways of life can be and established and maintained with digital technology. Yet, the needs of younger capitalist subjects are privileged in sociotechnical care networks. Older people undertake labour on the self to keep up and background their own need for care to protect the time of other, working family members. In this way, this chapter picks up on a thread that ran through all the analysis chapters. New forms of work and labour are necessary for digitally mediated care to function for older people. The way that technologies age creates work for the older person. New technologies must be adjusted to. When technology gets old it comes to require care to avoid care networks becoming destabilised. For digitally mediated care to function, older people undertake digital labour as they establish connections for care. The automated connections that result this labour from are central to contemporary forms of profit making (van Dijck, 2013).

The concept of citizenship is useful for making sense of the political implications of these ways that digitally mediated care functions. Political is evoked here, as is common in media and cultural studies, to refer to power dynamics in any facet of life (Gilbert, 2008). Care is strongly linked with citizenship. Policy interventions, interpersonal relationships, and assistive technologies are all forms of care that shape the possibilities for citizenship for older people. Particular political and economic formations set out regimes for self-care that good citizens must adhere to. This chapter argues that digitally mediated care constructs a particular form of citizenship - connected older citizenship. Connected older citizenship is constructed through interactions between older people, their friends and families, individual decisions about how

to manage device use, family connective practices, devices, automated forms of connectivity, technological marketing and business models, and government visions for ageing futures.

This chapter begins with an overview of citizenship to highlight how the concept has been approached. I then unpack the figure of the connected older citizen that digitally mediated care enacts. Connected older citizenship conceptually presumes that care, age, citizenship and technology are fundamentally entwined. Citizenship, as it is understood here, is heavily influenced by Latour's (1991) more than human ideals of citizenship and Papachrissi's (2010) networked citizenship. Drawing upon these two different frames for understanding citizenship is useful for theorising the way that the multiplicity of digital care practice that participants engaged in enact many different modalities of interconnected citizenship. Connected older citizenship speaks both to an experience of citizenship and an idealised, normative figure. A core idea for connected older citizenship is that connection underpins how good citizenship is understood for older people. Connected older citizenship expresses the citizenship that the 'fear of a grey planet' and attendant techno-fixes simultaneously constructs and respond to.

9.1 Citizenship in more than human networks

Citizenship, broadly, refers to belonging to a political body and having rights and responsibilities as a member of that political body (Ouellette, 2017). One component of citizenship pertains to the ways that individuals relate to others, as well as to 'society' and public affairs (Papacharissi, 2010). In contemporary societies, the nation-state is one important political body. Citizenship is the framework through which claims about the state's responsibility to take care of older people are articulated (Gilleard & Higgs, 2000). While the individual's relationship with the state is an important component of citizenship, contemporary conceptions of the citizen have expanded to encompass belonging to and contributing to other kinds of community (Janoski & Gran, 2002). Individuals belong to and have a sense of duty towards many different global, local, sociocultural, political and economic entities (Papacharissi, 2010).

There is a tension between the ways that citizenship is often evoked and ANT (as part of a broader set of new materialist and post-human theories). Theories of citizenship, while wildly diverse, generally require an agentic human subject and human civic realms stable enough to

be called ‘society’. In contrast, ANT considers agency as distributed and rejects the notion of society that stands apart from the natural world (Latour, 1991). For Latour, distributed agency does not mean that the human as the political subject of citizenship should be entirely done away with. Rather, articulations of citizenship must include the mediations between human and non-human actors that produce the ‘human’ (Latour, 1991). Further, ANT conceives of the political body to which members belong as not structured by a nature/society dichotomy. Latour instead posits the political body is a parliament of things, where:

> “Natures are present, but with their representatives, scientists who speak in their name. Societies are present, but with the objects that have been serving as their ballast from time immemorial” (Latour, 1991, p. 144)

Understood in such a way, the political collective is decidedly more than human. In Latour’s normative political collective, the complex networks of objects, discourses, natures and society must be visible.

Rather than representing a distinctly social ‘sphere’ of action, citizenship is treated practically here as co-constitutive with age, care, and technology. The mutual relationship between age, care, and technology has been detailed in the earlier sections of this research. Building on this, citizenship, age, care, and technology are understood here as shaping one another. They emerge as stable concepts through the interactions between actors in materially diverse networks. Practices of care are fundamental to the ongoing maintenance of democracy and citizenship. The ‘social’ realm that citizenship presumes is dependent on the maintenance of more than human networks that comprise civic institutions and the bodies, spaces, and technologies that comprise them (Puig de la Bellacasa, 2017). As Tronto (2013) argues, crises of care and crises of democracy are fundamentally linked. For example, there are undeniable links between the roll-back of civic institutions, concerns about care shortages, and the disenfranchisement of minority groups. People can act as citizens that participate in democratic processes because of the care that sustains the materially heterogenous networks that produce ‘human’ agency.

The relationship between the individual, collective bodies such as the state, and care is structured by age. Pension funds are a significant factor in global economies (Blackburn, 1999). The conception of self-hood that undergirds the Pākehā ideals related to citizenship emphasises values of independence, productivity, and self-maintenance (Lamb, 2014). Age is imagined as ‘eroding’ these values. Fears of an ageing population shape the duties and

obligations associated with national citizenship in 'developed' nations such as Aotearoa New Zealand (Katz, 2010). Concerns about the economic impacts of public spending, including on care for older people, are an actor that has contributed to neoliberal reform (Gilleard & Higgs, 2000). The potential burden that an ageing population will place on health and social services becomes justification for a policy emphasis on individualised self-care through the life course (Ward, 2015). This shapes how good citizenship is understood.

Citizenship is shaped and constituted by the material world, including, most notably for this research, technology. The human emerges as a citizen that can reflect, feel, and act politically through the interactions of sociomaterial networks (Latour, 1994; Schraube & Sørensen, 2013). The notion of network citizenship is useful for conceptualising the forms of citizenship engendered by digital technologies and the contemporary internet. What it means today to be part of a broader community is shifted by connective media. Social media alters how community is understood and configured (van Dijck, 2013), changing how belonging, rights, and duties are understood. These technological changes have configured the community to which individuals belong as a network (Castells, 2010; Wellman, 2001). In a networked understanding of community, individual and personal social networks are understood to be of primary importance (Burgess et al., 2006).

Papacharissi (2010) highlights that digital technologies converge economic, cultural, social, and political practices of citizenship into one mediated 'space'. Individuals connect to a range of civic institutions from the home (Papacharissi, 2010). Rather than public/private spheres, networked citizenship suggests that there are many connected, interlaced modalities of citizenship (Papacharissi, 2010). This 'networked citizenship' is characterized by an experience where individuals are connected to multiple more than human networks in which belonging, rights, and responsibility are realised. Individuals use digital technologies to participate in multiple, interconnected networks. Differing modalities of citizenship have differing expectations of individuals (Papacharissi, 2010). The model citizen in this context is adaptable to these differing expectations.

In the sections that follow, I unpack the notion of connected older citizenship as a way of conceptualising the citizenship that digitally mediated care enacts and, conversely, the citizenship that digitally mediated care responds to. 'Connected' expresses both the centrality

of connection to what it means to age well in Aotearoa New Zealand and the networked nature of this form of citizenship. The experiences of citizenship that older people have are contingent upon the ways that they are connected in actor-networks comprising materially diverse actors such as people, spaces, technologies, and institutions. The potentials for older people as citizens – whether their needs are met and whether they are able to participate and contribute to communities – depends upon precise the way that actor-networks are arranged and the connections that they have.

The model of network citizenship as it has been deployed by Papacharissi (2010) presumes the realms of citizenship as human spaces that are linked by digital technologies. As I apply this concept to the experiences of older people in Aotearoa New Zealand, I take a slightly different approach. I incorporate Latour's explicitly more than human approach to citizenship. How connection is understood and practiced in sociotechnical care networks is shaped by distributed, more than human agencies. Finally, 'older citizenship' situates the concept in broader discussions about the relationship between age and citizenship. Apocalyptic demography inflects how good citizenship is imagined for older people. Older people have distinct experiences that have not yet been theorized in literature relating to network citizenship. Connected older citizenship is fundamentally networked, more than human, and, at times, contradictory.

9.2 Connecting as the basis for good citizenship

Connectedness, as the analysis presented in this research shows, is core for understanding how digitally mediated care works. Connectedness underpins idealised citizenship for older people. For older people in Aotearoa New Zealand, familial and friendship networks organised around shared interests are an incredibly important for understanding older people's experiences of belonging, rights, and responsibilities for care. Use of different digital media is important for maintaining the emotional and practical connections that characterise belonging to these groups (Wellman, 2018). Having connections to a wide network of family and friends that can be drawn upon for support is a vital part of expressing good connected older citizenship. Being connected reflects that an older person is fulfilling the obligation to age well. Through the analysis chapters, a strong sense that being connected was a moral way to be was evident. Isolation (being 'unconnected') marks a failure of the self-care required for older people to

perform good citizenship. Connection makes social values for older citizenship, such as independence, possible.

Ensuring older people's connectedness is a goal expressed implicitly by the Aotearoa New Zealand government. State policies and strategies are important actors that shape age, technology, care, and citizenship. Digitally mediated connections are positioned by the Aotearoa New Zealand government as protecting individual well-being and the avoidance of negative health outcomes. This rhetoric shifts the state's responsibility to older people from the provision of limited material care and support interventions to the establishment of technical connectivity for older people. This way of positioning of connection is not unique to Aotearoa New Zealand. In an international survey of policy documents that address technology and ageing in place, Marshall et al. (2022, p. 9) identified connection as a core rhetoric for the Canadian government, noting that:

> "Social connections, along with connections to health-related supports, were centred as underpinning general well-being and quality of life, as well as linked to strategies for 'active ageing'."

Positioning the benefits of digital technologies in this way engenders a very particular version of good citizenship for older people, where being connected is understood as a pre-requisite for full societal membership.

Connection is a value that underpins citizenship because of the interrelations between political, economic, social, technological, and cultural actors (van Dijck, 2013). As Bollmer (2016) explains, the terms network and connectivity have a long history of being used to describe natural phenomena, such as bodies and cells. van Dijck (2013) argues that how connection is understood and used in contemporary society is influenced by what she calls 'connective media' – media such as social media that work by making automated connections between individuals, and between individuals and things. For van Dijck, human connectedness (a term that, as Bollmer recognises, has normative connotations of something natural) has been increasingly aligned with technical connectivity. In so doing, human connectedness is shaped to increasingly involve digital platforms such as platforms as a necessary part of life.

One implication of this, explicated in the analysis and below, is that care and citizenship come to be performed in ways that suit the business models of large technological companies such

as Facebook. When connectedness becomes a social norm linked with use of digital technologies, opting out becomes difficult. To entirely disconnect from Facebook is to disconnect from a large part of 'social' life. Given the normative importance of connection, this marks an aberrant performance of citizenship (Bollmer, 2012). The continual maintenance of connection is particularly important for older people, who are already positioned at risk for isolation.

9.3 Connected older citizenship: Possibilities, dynamics, and modalities

Through establishing connections for care older people are interpellated into connected older citizenship. Digitally mediated care spans many kinds of practices and relationships. Through digital care practices older people connect and are connected to a range of different networks, including friends and families, medical centres, consumer institutions, state institutions, technology corporations, and technologies. Each of these networks mediate the kinds of connections available to older people, in turn creating different experiences of citizenship. Accordantly, connected older citizenship is enacted across many interconnected networks. What constitutes good citizenship, the possibilities for citizenship in a particular network, and the values that link with citizenship are specific to particular networks. Each network has its own specific modalities – particular norms connected to belonging, rights, and responsibility. This section describes some of the possibilities, dynamics, and modalities of connected older citizenship that were evident in the analysis chapters: networked possibilities for political citizenship, managing connected presence and absence, surveillance citizenship, adult children and older people's citizenship, and more than human citizenship.

9.3.1 Networked possibilities for political identities

Across the analysis chapters, it was starkly evident that sociotechnical care networks often were not arranged in ways where the needs of older people were of primary importance. How networks function in terms of the possibilities for action and the norms of conduct, was often not determined by older people. Network arrangements impact the extent to which older people can take up the identity positions that are associated with good ageing citizenship such as 'independent' and 'empowered patient'. As older people engage in practices of digitally mediated self-care to meet their everyday needs, they participate in consumer markets.

Accessing medical care increasingly requires older people to engage in digitally mediated care practices. I have argued that the way these networks are arranged is often not in line with the needs and priorities of older people. This directly impacts older people's experiences of citizenship.

Being an independent person is a particularly important political identity that older people wish to preserve. Political identity and consumer identity are entwined (Papacharissi, 2010). The realisation of rights, duties, and sense of belonging associated with citizenship are often enacted through acts of consumption (Banet-Weiser, 2007). Contributing to communities and accessing the benefits of being in communities is made possible by acts of consumption. Being able to consume marks full participation in social life (Gilleard & Higgs, 2000; Katz, 2001). For the older people involved in this research, independence was strongly associated with being able to undertake consumer tasks such as grocery shopping, banking, and paying bills. The possibility for good citizenship as an independent person depended upon being able to use digital technologies to manage connections between the self and consumer institutions. The commercially owned infrastructures older people encounter are designed based on values of efficiency and profit maximisation. This shapes how the sociotechnical networks older people encounter when trying to meet their needs function, and the possibilities for older people's citizenship.

Similarly, taking personal responsibility for health is widely understood to be a pre-cursor for good citizenship (Crawford, 2006). This is particularly true for older people (Laliberte-Rudman, 2015). The idealised citizen uses digital technologies to become an activated and empowered patient that draws upon multiple strands of health information, including self-tracking data, their health records, and diet and lifestyle advice (Katz & Marshall, 2018; Lupton, 2013). The possibility for achieving this vision relies on older people having access to the technical means to access information. I have argued that there is a significant gap between the way that sociotechnical networks connected to medical care are imagined and how they function. The medical centre remains a particularly important actor-network that shapes older people's experiences in the sociotechnical networks they are seeking medical care within. Patient portals are a key digitally mediated care technology available to older people in Aotearoa New Zealand. Ultimately, these technologies function in ways that primarily address the specific needs of medical centres. This impacts the extent to which older people can realise the version of good citizenship that is articulated.

To be very clear, the issue is not with the older person, but with how the networks that must achieve care within are organised and function. Locating a 'problem' with the older person belies the human and non-human actors involved in digitally mediated care. Mapping the sociotechnical networks of older people makes evident the ways that care and the ability of older people to contribute and participate on their terms was hampered by a range of actors. Neoliberal state-making activities, including a shift away from long-term care and the commercialisation of medical care, ultimately mean that the infrastructures within which older people must achieve care are increasingly digitised as a cost saving measure. Policy settings in spheres not obviously connected to care, such as banking regulations, mean that the possibilities for valued political identities such as independence necessarily involve being able to successfully translate several technologies, changing what constitutes self-care for the older person.

9.3.2 Managing connected presence (and absence)

This research has posited that a crucial dynamic for belonging in sociotechnical care networks can be described using the frame of ambient co-presence offered by Ito and Okabe (2005) and Madianou (2016). The experience of digitally mediated care for older people in Aotearoa New Zealand is characterised by the persistent sense of the availability of other people in the background. Being available for communication at any time is a central part of the cultivation of ambient co-presence. The analysis chapters have detailed the ways that establishing ambient co-presence supports care through a sense of togetherness despite geographic distance, having someone always available to discuss concerns with, and engendering a feeling of safety. Establishing ambient co-presence makes ageing in place in possible.

The analysis chapters highlight that maintaining a connected presence is an expected behaviour of the connected older citizen. There is a social obligation to always be available for interaction (Licoppe, 2004). Unavailability must be negotiated and justified (Licoppe, 2004). Frequent, embodied checking of digital devices to manage and respond to messages is both a pre-requisite and condition of contemporary life (Burchell, 2015). This constant checking can be considered a new habit for connected citizenship (Papacharissi, 2010). It is a social obligation that is associated with being part of network communities. Frequent, embodied checking of

digital devices was learnt by older people through connection as care relationships. Through connection as care older people engage in negotiations related to how to be continually available to other people. Being constantly available for connection is part of being cared for with digital technologies, as well as part of caring for others.

A component of successfully performing connected older citizenship is being able to undertake complex negotiations between being present and being absent from different networks. Care of the self is required to maintain the status as connection ready. Strategic acts of disconnecting from particular networks make constant connectivity possible (Light, 2014). Disconnection in this context is not the same as making the decision to entirely avoid using digital technologies. It refers to the way that older people make strategic decisions about which networks to engage with and how. It requires drawing upon situational knowledge and involves balancing between competing interests. Having to manage of connections is a novel form of responsibilisation associated with belonging to sociotechnical networks (Abeele et al., 2018). Failure to manage connections can result in being unable to meet care needs.

Making these decisions about where it is appropriate to disconnect is a core component of connected older citizenship. Across the analysis chapters, several disconnections for self-care were highlighted. Common disconnections included making decisions about which communicative platforms to engage with, how much to share online, how much time would be spent undertaking a particular online activity, who to 'friend', which online behaviours to opt out of, when it is appropriate to leave a cell phone at home. Existing research has highlighted that establishing ambient co-presence, a form of connection as informal care, can be an ambivalent experience. The need to be constantly connected to another person is time consuming (Beneito-Montagut & Begueria, 2021). It can involve relations that are experienced as controlling (Nedelcu & Wyss, 2016). For older people, being able to manage these different dynamics so to balance maintaining a relational network of people that provide support and their own self-care is an important component of 'good' connected older citizenship.

Expectations regarding presence depend on how people are positioned within sociotechnical community networks. The extent to which disconnections are possible vary greatly between different people in different situations (Portwood-Stacer, 2014). While the connected older citizen is often expected to be always available to those who care for them, they cannot

necessarily expect the same in return. The temporal needs of the more 'productive', younger citizens are prioritised in the culture of connectivity.

9.3.3 Surveillance citizenship

Digitally mediated care practices are one way that peer-to-peer surveillance becomes an expected and normal part of older people's lives. Willingness to engage in peer-to-peer surveillance makes good citizenship possible regardless of age. The network citizen might be entitled to expect autonomy and control, but they cannot expect privacy (Papacharissi, 2010). Duffy and Chan (2019) have argued that younger people are taught in families, education, and employment to anticipate social media surveillance. Through this education, peer-to-peer surveillance is constructed as an expected, normal part of life (Duffy & Chan, 2019). In a similar way, through surveillance practices in digitally mediated care relationships, peer-to-peer forms of surveillance are further constructed as a normal and expected part of life. Engaging in peer-to-peer monitoring through digital technologies is a central practice of contemporary life (Papacharissi, 2010), and a way that everyday care is realised (Leaver, 2017). A central part of connected older citizenship is willingness to engage in peer-to-peer surveillance. Through caring relations, this surveillance is negotiated and naturalised.

Careful surveillance is a one form of social surveillance (Andrejevic et al., 2021). Social surveillance originally was theorised as encapsulating a particular form of peer-to-peer surveillance present on social media. Used in this way, the term refers to a situation where users monitor each other by consuming social media content generated by users. Through the mutual practice of watching others and being watched, social media users:

> "…formulate a view of what is normal, accepted, or unaccepted in the community, creating an internalized gaze that *contextualizes* appropriate behaviour" (Marwick, 2012, pp. 384, emphasis in original).

Social surveillance encapsulates how watching other people using social media while knowing that you are also being watched ultimately encourages people to direct their behaviour in particular ways (Marwick, 2012). An important point highlighted by the notion of social surveillance is that standards and conduct for belonging are negotiated and maintained, in part, through the process of engaging with and generating content on social media.

A novel form of social surveillance is present through the analysis chapters. This form of self-monitoring and watching others expands upon Marwick's original conception. In the analysis chapters, I have employed the frame of careful surveillance developed by Richardson et al. (2017) and expanded by Andrejevic et al. (2021). Originally conceived of to address relations between human and companion animals, careful surveillance denotes practices of monitoring, watching, or checking on in paradoxical care relationships which are characterised by asymmetries, non-reciprocity, as well as affective concern (Richardson et al., 2017). Applied here the term usefully frames the particularity of familial relations: adult children gift technologies, set patterns of engagement with social media or other messaging applications, and influence how older people use technology. A schedule of engagement and checking in, often based on their terms, is established. In this way, careful surveillance is characterised by unevenness.

The practices of surveillance described in the analysis chapters are qualitatively different from many existing practices of surveillance for older people. Careful surveillance may not be entirely reciprocal, but it is nonetheless distinct from hierarchal, institutional forms of monitoring. Further, it is distinct from surveillance in relationships that can be more intimate such as dys-tracking (Mort et al., 2020). While careful surveillance and dys-tracking both involve "the focused, systematic and routine attention to personal details" (Lyon, 2007, p. 14), in the relations of careful surveillance outlined in the analysis chapters, the older person takes on a more active role in being monitored. They are often actively monitoring other people's wellbeing themselves. Careful surveillance, as the term has been employed in the analysis chapters, is productive – it expands the capacities of the older person. Careful surveillance was linked very closely to establishing an ambient co-presence, through practices of checking in. Entering into relations that can be characterised as careful surveillance make other subject positions associated with good older citizenship, such as independence, possible.

Other practices of self-monitoring and monitoring others reflected in the analysis chapters reflect uneasier relations of care and careful surveillance. This kind of monitoring was evident in the ways that certain usages of technologies were coded as dependent, as well as the ways that usage and care for devices was coded as 'proper' usage expressed by using digital technologies in the right kinds of ways. A key example of this was connected to the proper ways for managing risk in relation to digital technologies. Older people monitor how other older people use digital devices, while also having their device use monitored by others

(including other, younger people). This kind of categorisation of the ways that older people are using devices reflects a novel form of digital ageism (Rosales et al., 2023). There is a degree of (often internalised) age-related discrimination implicit in these practices of negatively categorising older people's device use. Negative characterisations of older people as lacking the ability to use technology according to a standard of propriety (Comunello et al., 2022) here intersect with dominant ideas about the pursuit of independence as core way that appropriate older citizenship should be performed.

Through these surveillant practices of ageism, norms related to what is appropriate in relation to sociotechnical care are constructed and reinforced. What constitutes an appropriate way to be connected for care, how to properly care for technologies, and how to display appropriate self-care (including risk management) are determined communally (Comunello et al., 2022). Such 'idioms of practice' are based on the affordances and material characteristics of different platforms as well as individual and shared perceptions of appropriate conduct (Gershon, 2010). One of the ways these norms are reinforced, as is evident in the analysis chapters, is through watching and commenting upon how other people use devices. At the same time, it is evident that other people watch over and comment upon older people's technology use. In this way, particular significations of care (Andrejevic et al., 2021) shape the norms of connected older citizenship as well as constitute performances of connected older citizenship.

Connected older citizenship involves multiple, connected practices of surveillance. The particular ways that sociotechnical networks align produce different experiences of surveillance for older people (Albrechtslund & Lauritsen, 2013). Here I have charted just two of the ways that connected older citizenship and care overlap. Older people are subject to the disciplining gazes of health and welfare professionals (Powell & Biggs, 2000) through the transformation of aspects of their lives into data (Gilleard & Higgs, 2000). An ever-expanding range of digital technologies make forms of surveillance a central part of many forms of care for older people, in institutional and home-based settings (Mortenson et al., 2015). Similarly, older people increasingly engage in practices of self-surveillance of their bodies (Marshall, 2018). Rather than an absolute, complete gaze, different surveillant practices are made by possible in different materially heterogenous networks (Latour, 2005). Whether surveillance is productive and can contribute to older people's flourishing or whether it restricts older people's agency, as in 'dys-tracking' (Mort et al., 2020), is fundamentally contingent.

9.3.4 Adult children and older people's citizenship

The discussions of managing connected presence and surveillance citizenship describe novel ways that older person must navigate their own care needs in 'social' networks with specific norms for conduct. In these networks, there are two notable mediators that shape how connections are formed and experienced by older people: adult children and digital technologies. Digital technologies, as a complex actor-network that influence how connections are formed and the kinds of citizenship that result, will be discussed in the next section. This section concentrates on the way that adult children mediate the connections of their ageing parents.

Adult children have a particularly unique role as network builders in the sociotechnical care networks that generate connection as care. This research suggests that the many of the connection as care arrangements within the sociotechnical care networks of older people benefit adult children and are organised based on their preferences and concerns. Adult children were often instrumental in encouraging their parent (or parent-in-law) to use particular kinds of digital technologies. At one point in time, they were comparatively familiar with digital technology in contrast with their parents. As such, adult children gifted their parents' digital devices, encouraged their parents to purchase new devices, and played an important role in supporting their parent's early use of devices and platforms. In this way, adult children were a sociotechnical network builder. Their actions established the networks through which connection as care (characterised by affective and practical elements of care) could be realised.

The naturalness of adult children's role in establishing their older parent's technology use is reinforced in technological marketing. This was clearly reflected in the third analysis chapter. Adult children are interpellated into a position of care responsibility in the marketing of a fitness watch. Gifting a parent a device is established as a logical way to manage a care responsibility. This reflects one particular form that ageist representations of older people technological marketing takes: a depiction of older people as a 'problem' that technology usage can manage (Ivan & Loos, 2023). More generally, there is a representational trend where younger people are positioned as knowledge holders in relation to technology (Comunello et al., 2022; Rosales et al., 2023). These kinds of representations shape how technology use is

understood and managed within sociotechnical care networks. When adult children are the expert relating to technology, their concerns are afforded more weight.

Because of the role that adult children have in establishing sociotechnical care networks, this influence over how sociotechnical care networks were arranged (and thus how connection as care functions) was often retained, even as older people became much more familiar and confident with digital technologies. As an example of adult children exerting influence over how sociotechnical care networks are structured and the effects of this for older people's experience of community participation is related to platform choice and use. Different platforms have different communicative affordances – they make different ways of connecting possible and impossible. The features of a communicative medium impact the affective experiences it produces (Baym, 2015). At the time of being interviewed, all participants were users of many different devices and platforms. They had their own preferences about what kinds of digitally mediated communication they preferred. There were features of platforms that they valued and features of platforms that they did not particularly like or found difficult to use. Yet, adult children often made decisions about which platforms were used for communication.

Older people lacking choice over which platforms are used for the maintenance of regular communication impacts upon the extent to which connection can be realised as care on terms that are most acceptable to the older person. The imbalance between the parties that are connecting for care is evident here. For the older person, establishing connection as care is a necessary part of ageing in place. This compels for them a degree of compromise to maintain the connection. Madianou and Miller (2013) describe how when people have access to digital technologies and 'media literacy', the choice of technological medium ('which platform to use?') can be understood as a social act (rather than one of a necessity borne solely from cost or skill). As social is being used here it does not refer to a 'society out there', but to the way each act of choosing a medium and how to use it has relational consequences. When other actors, such as adult children, made decisions about which platforms to use and how they were to be used, older people's preferences, skills, and needs are undermined.

Adult children occupy an important role in sociotechnical care networks. They are often instrumental in connecting their parents. This shapes older people's experiences of citizenship,

and the possibilities they have for participation and care. Once older people are connected, they are implicated within networked flows of data that are necessary for commercial profit making. At the same time, connecting older people is a way that families make ageing in place possible. The activity of adult children is important in creating the sociotechnical infrastructure for government responses to the ageing population.

9.3.5 More than human citizenship

How older people experience citizenship is shaped by the kinds of connections that they have. Citizenship is a way of encapsulating belonging to a particular community. This section of the chapter so far has detailed the kinds of connections that older people in communities that are comprised of sociotechnical networks. It has charted managing connected presence and surveillance as two particularly important community norms and positioned adult children as an important mediator of older people's connections. Digital technologies are not a passive actor within these communities. These communities take form because of the mutual constitution of 'society' and 'technology'.

Facebook is an important, complex mediator of 'social' citizenship. Connections formed through Facebook reflect an interplay of agencies distributed across human and non-human actors. Users make decisions about how to engage based on their own preferences. These preferences are shaped by careful surveillance and acceptable idioms of practice. Adult children can be a mediator of older people's social media usage. For many older people, social media is an important, albeit ambivalent, part of life. In the first analysis chapter, Facebook was presented as an OPP. It offers immensely valued access to community and provides older people with a means to fill in time. Negotiating whether or not to use Facebook is an important part of demonstrating appropriate connectedness.

Automated forms of connectivity shape the possibilities that older people have for connection (van Dijck, 2013), for care, and for citizenship. Facebook's interface is focused upon user-to-user experiences (van Dijck, 2013). User-to-user connections link the older person with other people, groups, and media content (such as news and recipes). Less visible to users, adaptive algorithmic architectures curate these connections (Bucher, 2015). Facebook configures its news feed based on assumptions made about relationships inferred from rankings of past

Facebook activity (Bucher, 2018; Cheney-Lippold, 2017). Facebook also makes connections between users and their activity on other websites (van Dijck, 2013). This is achieved through technical features such as cookies and embedding like buttons on websites. This automated connectivity involves speeds and scales of data processing well beyond human ability.

Decisions made related to how digital technologies are designed also influence the kinds of connections older people have. Meta is a corporate social media site. The imperative for Meta to achieve profit is an actor that influences design decisions connected to how Facebook works. Meta continually explores ways to direct user attention toward marketing messages (Gehl, 2014). Profit is achieved for Meta by creating automated connections between users and advertisers. How Facebook is designed influences the norms and cultures of use that circulate (van Dijck, 2013). Ultimately, particular kinds of connections for older people emerge in a complex actor-network where human and non-human agencies interact and mutually construct one another. The particularity of these connections shape the conditions of possibility for older people's care and citizenship.

The idea that connected older citizenship is a more than human experience is not simply an ontological position divorced from older people's actual experiences. In the sociotechnical care networks of connected older citizenship, care is relational and distributed. As has been demonstrated across this research, care is not just a human endeavour. Digital technologies are instrumental in producing new forms of care and offer new ways to realise the individuation of the welfare of older people. Simultaneously, digital technologies require continual care (Mol et al., 2010). In sociotechnical care networks, older people are continually attuned to what digital technologies require to continue to work. Several care practices for devices have been described in this research, from charging to fixing broken devices. These care practices were often undertaken for the explicit purpose of extending a devices lifespan.

Fundamentally, digitally mediated care involves a subjective experience of being responsible to the more than human actors that are involved in producing care. The older people involved in this research were community dwelling and using technologies that they were the primary user of. Yet other research suggests that even when older people are the 'subject' of monitoring technologies, rather than the 'user', they still enter into similar kinds of caring relationships. Gallistl and von Laufenberg (2023), for example, demonstrated that older people in long term

care facilities invested significant time into understanding an algorithmic falls detection system. This enabled them to practice care for the system by learning how to avoid false alarms. The point is not to romanticise this care – as I have described in the analysis chapters, it can be draining work that is experienced as time wasting or frustrating. Further, the work older people undertake caring for technologies can reinforce sociotechnical arrangements that do not entirely suit their own care needs.

Nonetheless, this research has highlighted that an ethical obligation to technologies, and by extension the people and environments who are harmed in their making, clearly existed within the sociotechnical care networks studied. The infrastructures that maintain this care connect the older person's sociotechnical care networks to many other networks and infrastructures. These connections impact upon older people's sense of belonging. Connected older citizenship involves balancing the individual person's need for care against the norms of networked forms of community. It also involves older people balancing their need for care with a desire to preserve the functional life of technologies. These negotiations can be considered an expression of care and duty towards other people, places, and materials quite removed from the older person in Aotearoa New Zealand's everyday life. While the 'social' aspect of connected older citizenship expresses that older people meet their needs through sociotechnical networks in response to rolled back social policy, the sense of belonging and mutual obligation associated with connected older citizenship is expressly more than human.

9.4 Connected older citizenship and the expansion of the ageing enterprise

Connected older citizenship posits that through practices of digitally mediated care, very particular kinds of political subjectivity are enacted. The rhetoric of connection accompanies a mode of citizenship where the ageing individual primarily draws upon individualised networks of family, friends, and technologies to age in place. The possibilities for independence and empowered patient-hood emerge (and can be foreclosed) in sociotechnical networks. Digitally mediated care practices connect older people into sociotechnical communities, with fixed norms for accepted conduct that must be negotiated. Connected older citizenship reflects the development of state responses to ageing populations across the 21st century. The role of the state to care for obligation is to 'empower' and 'activate' older people (Katz, 2000) to be able to make connections.

When older citizens connect, they are taking up the individual responsibility for their care. However, empowering older people to connect also has the dual effect of expanding the ageing enterprise. Central to the idea of the ageing enterprise is that older people and processes of human ageing are commodified, made profitable by a number of institutions including care facilities and pharmaceutical industries (Estes, 1979). The ageing enterprise highlights that while social policy responses to ageing emphasise that individuals have personal responsibility for their own care, they have also supported the development of large, immensely profitable enterprises proffering goods and services that pertain to the medical and social care of older people, often drawing upon public funding (Estes, 1993). Gallistl and von Laufenberg (2023) highlight that the datafication of care expands the ways that older people and processes of aging can be made economically valuable. There is a significant market for data that technologies such as self-tracking and gerontechnologies generate (Marshall & Katz, 2016).

A novel form of the relationship between datafication and the ageing enterprise is reflected in the analysis chapters. Digital inclusion measures such as digital training programmes, as a state level care response, give older people the tools to participate in community networks to achieve care. But they also create digital labourers. Older people are compelled to become users of digital platforms such as Facebook and WhatsApp because they are where care takes place. As older people engage with these platforms, they create community spaces, which make the platforms more appealing and valuable. This content created does not belong to older people. It belongs to large corporations such as Meta, who expressly profit from it (Fuchs, 2014). A similar logic is evident with digital platforms beyond social media, such as Help X. Continual engagement with the site is necessary to achieve connections for care. This continual labour makes the platform more valuable.

Linking the notion of the ageing enterprise and digital labour is productive because it makes evident the way that the state creates markets where ageing and care can be made profitable. Commercially available social media platforms are an important space for everyday care. This care does not exist separately from the activities of the state. Older people's participation in social media communities is materially supported through digital inclusion initiatives. Further, individuals turn to social media and other digital platforms such as Help X as a way of managing real needs for care when there are no other options for care available. When the state encourages the use of technology to stay connected, to promote independence, to seek medical

care, it scaffolds and subsidises particular kinds of markets and particular kinds of consumer decisions – it makes connected older citizens.

9.5 Conclusion

Connection, in both the social and technical senses, is particularly important for understanding how digitally mediated care works for older adults in Aotearoa New Zealand. This chapter has introduced the concept of the connected older citizen as a way to make sense of the political implications of digitally mediated care. Connected older citizenship is a form of networked citizenship characterised by an experience of citizenship that is fundamentally multiple. As older people participate in many different care practices, they engage with many different networks. Each network has its own modality of citizenship, with unique practices that characterise belonging and shape what kinds of care people receive and the kinds of obligations that they have.

Tracing the different forms that connected older citizenship took for older people in Aotearoa New Zealand makes the political nature of connected older citizenship evident. On one hand, connected older citizenship expresses belonging in more than human networks where older people negotiate their own needs with community norms and in relation to the well-being of others. However, connected older citizenship also represents a new frontier for the ageing enterprise. When connectedness, as a social value and technical attribute, underpins the state's response to the ageing population, it creates a new class of digital labourers and a new way that ageing can be made profitable.

Digital labour links older people's labour in the expanded ageing enterprise to a global network of other people, places and materials that labour to produce and maintain digital care infrastructures (Fuchs, 2013). To understand how digitally mediated care functions, it is important to critique digitally mediated care in terms of the context of consumption, to chart the ways that it offers new possibilities and constraints for older people in Aotearoa New Zealand. Sociogerontechnology (and STS) go further, directing attention to the ways that technological design shapes older people's experiences of care and ageing. Media and cultural studies literature related to digital labour and media materiality helps expand the networked focus again by looking at how age, care, and technology are planetarily and multi-temporally

constituted. The experiences of ageing and citizenship that digitally mediated care enacts are entwined with resource extraction, human exploitation and suffering, pollution, and climate change. The sociotechnical imaginary for digitally mediated care relies upon the making these networks invisible. When digitally mediated care functions in disempowering ways, older people in Aotearoa New Zealand's experience of age and citizenship are negatively impacted. Understanding these impacts on a global scale makes the demand for better ways of caring for an ageing population even more urgent.

10. Digitally mediated care in Aotearoa New Zealand communities

Digitally mediated care is linked with a sociotechnical imaginary that emphasises the ability of technology to preserve older people's social connections, independence, and health while simultaneously protecting the time of younger populations. As Neven and Peine (2017) argue, digitally mediated care is presented in policy documents and media discourse as a logical solution for the 'problem' of the ageing population. It purports to offer benefits for individual older people, whose lives will be enhanced by every day and care technologies. Technological innovations promise to improve the experience of ageing in place. They offer social benefits, as younger generations will be freed from the burden of caring for ageing parents. Digitally mediated care is imagined as being cost efficient, reducing the amount that needs to be spent on care and welfare services for older people. Finally, digitally mediated care offers economic benefits. 'High tech' care applications are a marketable commodity (Neven & Peine, 2017).

When technologically enabled care is positioned as a response to the problem of ageing populations in this way, it is imagined as an instrumental 'means to an end'. It can straightforwardly realise thorny and at times contradictory human goals related to the care of older people. Technology will make older people both more connected and more independent. It will make medical care more efficient for care providers while also empowering older people as patients. In the sociotechnical imaginary of digitally mediated care, there are utopian and dystopian visions. In utopian visions, technology gives older people more control of their lives. It increases our ability to live well into older age. In dystopic visions, digitally mediated care is an alienating and dehumanising experience for older people (Sparrow, 2016). This research has joined a body of media and cultural studies, STS, and sociogerontechnology literature that argues that the reality of digitally mediated care is complex and fundamentally situated.

In exploring how digitally mediated care functions for community dwelling older people in Aotearoa New Zealand, connection was found to be a central care and self-care practice. 'Connection' as it used here describes the inextricability of technical connectivity (setting older people up with devices), automated connectivity (where connections between older people and other actors is achieved algorithmically), and human connectivity (the sense and practice of being connected to other people) in sociotechnical care networks. How older people experience sociality, independence, health, and time depends upon the particularities of the connections between people, spaces, devices, institutions and care providers. Everyone experiences the

different forms of connection that comprise digitally mediated care – age influences the shape and form of these connections.

In this research, I have developed the concept of the connected older citizen to encapsulate the form of citizenship for older people that digitally mediated care practices enact. I have argued that this form of citizenship is fundamentally multiple. Older people's experiences of citizenship are dependent on the different kinds of connections they have in different sociotechnical networks. In older people's everyday lives, connected older citizenship involves new forms of responsiblisation connected to managing presence, new forms of social surveillance, more than human interdependencies, and new forms of digital labour. This chapter offers final reflections on the research process and suggests ways the concept of the connected older citizen could be developed.

10.1 Reflecting on the research question and process

The theoretical and methodological framework used in this research, inspired by the combination of ANT and PE used by van Dijck (2013), was admittedly unconventional. For van Dijck, the benefit of the dual approach was to produce a robust and multi-layered analysis. In this research, drawing on ANT to trace relations between people and technology with network mapping and thematic analysis led to rich descriptions of how care functioned in the everyday lives of older people. In tracing these connections, the ways that interactions between human and non-human actors enabled and constrained possibilities for older people became evident. Through arrangements of people, spaces technology, and time older people maintain their social connections, independence, health, and structure their days in meaningful ways.

Tracing these networks showed the immense work and labour necessary for older people to achieve digitally mediated care in the Aotearoa New Zealand community. This is connected to the way that people and technologies are often arranged in ways that do not reflect the needs and priorities of older people. Varied forms of temporal labour undertaken by older people ensure that they keep up in cultures of speed. Labour to be connection ready benefits the state because it enables older people to better meet their care needs within networks of their family and friends. It benefits technology corporations who can monetise older people's automated connections. It benefits a range of actors including banks and medical centres who can increase

their profit margins by digitising services. The work caring for devices reflects design choices made by companies who purposely shorten the useful lifespan of products to drive continued consumption.

The PE approach was useful for making sense of this labour, as well as providing a means to untangle the densely connected actor-networks to which the sociotechnical care networks of the participants connected to. Using the vocabulary provided by PE approaches to mark particular kinds of relations as digital labour allowed me to explore the consequences of sociotechnical care networks that direct older people to connect. Further, the PE approach provided some guidance about which networks and associations were significant to follow. From a practical perspective, one sociotechnical care network offers a multitude of associations that could be traced (Latour, 2005). The business models of technological providers and state policy connected to ageing were to a degree presumed in advance to be significant actors (van Dijck, 2013).

The notion of the connected older citizen is one way to try to make sense of the political implications of digitally mediated care. Guided by van Dijck (2013), the concept links the sociotechnical care networks of the participants studied through densely connected nodes such as medical centres, Facebook, and the state to enact particular political identities. I have argued that through practices of digitally mediated care involving devices, homes, and people, older people adopt modes of citizenship organised around connecting as a primary means of participation. In these networks, other actors direct how older people can act and shape the types of connections they can make.

When these sociotechnical care networks are linked together by densely connected actor networks such as the state, it was productive to conceptualise power in the more institutional terms offered by PE (van Dijck, 2013). The connected older citizen is a way of responding to state-level initiatives that encourage older people to connect, from digital inclusion policies and interventions to policy settings that shape older people's participation in consumer infrastructures. The work that the state does to connect older people engenders specific experiences of citizenship. Insofar as digital labour is central to these experiences, this work also expands the terrain of the ageing enterprise, further commodifying the processes of ageing.

10.1.1 Digitally mediated care and age

Age in this research was understood as a distributed phenomenon. What it means to be 'older' is not fixed but is shaped by interactions between human and non-human actors in diverse actor networks. The experience of age does not follow simply from a chronological marker – there is not a standard way to 'be' 80. Participants' differential paths and opportunities through the life course shaped their experiences as older people. Age is similarly not solely a product of biological processes. Chronological, biological, and physiological processes and actors intersect with technological, social, cultural, political, and economic processes and actors (inter alia) to produce 'age' (Katz, 2014).

A very broad approach was taken to care in this research. Inspired by Puig de la Bellacasa, care was conceptualised as the diverse range of activities associated with the maintenance, continuation, and repair of the shared world so "we can live in it as well as possible" (Puig de la Bellacasa, 2017, p. 4). Care was understood as a fundamental part of older people's everyday life as opposed to a phenomenon linked just to health and illness (Beneito-Montagut & Begueria, 2021). Rather than a solely human endeavour, here care has been posited as produced in the interactions between human and non-human actors. Care was discussed as material, mutual dependencies between people, technologies, materials, and places (Beneito-Montagut & Begueria, 2021) as well as an affect.

The broad approach to care shaped the research sample as well as the kinds of digitally mediated care practices that became visible. The participants of this research had variable experiences of digitally mediated care and utilised a range of everyday technologies and gerontechnologies. However, there were notable omissions. For example, no participants had experiences with home monitoring systems. A more focused approach to care would have directed recruitment in a different way. I have argued that connection is particularly important for understanding how digitally mediated care functions to enact sociality, independence, health and the rhythm of everyday life for older people. Given that experiences of age and citizenship are shaped by digitally mediated care practices, participants that had experiences of different care technologies would have experienced connections, and thus age and citizenship, in different ways.

The digitally mediated care practices described in this research, as well as many of the interpersonal dynamics as well as personal and institutional experiences, are not limited to older people. Many of the implications of having corporately owned software platforms as OPPs in sociotechnical medical care networks are not specific to older people. Nonetheless, being an 'older person' shapes how people use technologies and the kinds of sociotechnical care networks that they are part of. For example, people of all ages use patient portals as part of their relationship with their doctor. The 'empowerment gap' highlighted in chapter seven between what a patient portal is imagined as being able to do and what it can do in practice is relevant to patients of all ages, as Lupton (2013, 2016, 2017) has shown. However, being 'older' can involve new experiences (such as retirement and changing health conditions) creating specific requirements for care and self-care. In this context, the 'empowerment gap' has particular manifestations and effects. How corporate software providers as OPPs shape sociotechnical care networks is contingent, with age being one actor shaping such contingencies.

Further, as people age, there are also new social norms and expectations to negotiate. Ageism is an especially important actor-network shaping older people's experiences of digitally mediated care with everyday technologies not specifically designed for older people. Western cultures emphasise the desirability of being a productive, independent, connected person (Lamb, 2014). There is a widespread social understanding of older people as fundamentally 'declining' or 'technologically challenged'. This creates new forms of identity work and self-care specific to older people. For example, people of all ages must make decisions about social media participation including which platforms to use, what to share, and how much time to spend on such activity. For older people, this decision must be negotiated in ways that preserve socially valorised identities in the context of ageism. This can involve favouring particular kinds of usage and developing particular kinds of justification for usage and non-usage. A technologically competent, active identity as an older person is stake. Younger people (particularly those with socially marginalised identities such as LGBTIQA+ youth) do face considerable complexities and risks in making decisions about social media use (Triggs, Møller, & Neumayer, 2021). The performance of appropriate self-care with digitally mediated technologies is fraught for everyone – age and ageism are specific factors influencing the shape and form of such care complexities.

10.1.2 Limitations of the research sample

The characteristics of research sample greatly influenced which network dynamics were visible and which were obscured. I have argued in this research that older people's experiences of connected older citizenship are shaped by the specific networks that they connect to. There is no one connected older citizenship. Older people have many different experiences of citizenship based on their position in many different, interconnected sociotechnical networks. As mentioned, there are some densely connected actor-networks that the sociotechnical care networks of many older people connect to (such as state). This means that some of the dynamics and modalities of connected older citizenship speak to network dynamics 'beyond' the sample. However, incorporating a more diverse range of participants would have enabled an extended sketch of connected older citizenship.

For example, the research sample was culturally and racially homogenous. All participants were either Pākehā (New Zealand European) or immigrants to Aotearoa New Zealand from the United Kingdom or America. The homogeneity of the sample may reflect the composition of the organisations I recruited through. The fast response from older people interested in participating saturated the small sample size very quickly. The homogeneity of the sample is significant because age is understood differently across cultures. Ageing is devalued in specifically 'Western' cultures (Stephens & Breheny, 2018a). In other cultures, such as for Māori, older age does not carry negative connotations (Durie, 1999). Cultural differences in how age is valued influences how older people understand themselves and their role in the communities they are a part of. Further, it shapes how older people are treated within communities and the kinds of treatment that older people expect.

One of the core arguments made in the analysis was that independence was a key value that shaped how sociotechnical care networks were arranged. Participants cared for their identity as independent people and strove to avoid unnecessary reliance on other people. Through acts of careful surveillance of technology use, ways of using technology for care were categorised using a frame of dependence. Other research conducted in Aotearoa New Zealand with predominantly Pākehā samples similarly finds that independence is a core way that questions about care, help, and support are framed by older people (Breheny & Stephens, 2012). Research in other 'developed' national contexts such as Canada, conducted with primarily non-

Indigenous samples, also emphasises that negotiations around independence and dependence are a significant component of caring relationships in later life (Barken, 2019). Independence is a dominant Western value that shapes how good ageing is understood (Katz, 2005). This is reflected in media (Rozanova, 2010), social policy (Barken, 2019), and global institutions such as the World Health Organisation (Walker, 2002).

Connected older citizenship expresses that possibilities for older people's citizenship are shaped in sociotechnical care networks. In sociotechnical care networks, political identities such as 'independent older person' are made possible. For participants, being able to 'independently' meet needs through digitally mediated acts of consumption as self-care was very important. This finding influenced how the concept of connected older citizenship was developed. Yet, this emphasis on independence is not the only way that age is understood and practiced. Not all cultures emphasise the desirability of independence.

For example, a study of Kaumātua Māori[7] ageing in place in a costal settlement in Te Ika-a-Māui[8] found that through the deep connections with place, a "comforting and comfortable dependence on land and family" enabled freedom and autonomy (Butcher & Breheny, 2016, p. 51). Versions of good caring relationships, and what constitutes a meaningful life as an older person, do not always involve seeking to avoid the reliance on other people that is strongly associated with independence in Western value systems (Butcher & Breheny, 2016). Insofar as 'independent' is a political subject position expressed as desirable in Aotearoa New Zealand society, Kaumātua Māori still must (at least to a degree) negotiate themselves in relation to this norm. A more diverse research sample could have led to a broader range of digitally mediated care and self-care practices. Having evidence of these care practices to draw on would have led to a different picture of the connected older citizenship being sketched.

10.2 Directions for future research

The figure of the connected older citizen offered in this research is useful for expanding media and cultural studies, sociogerontechnology, and STS literatures related to digitally mediated care, age, citizenship, and technology. Seminal media and cultural studies literature that has

[7] A term in te reo Māori for a respected elder. Kaumātua is not a symmetrical translation for the English 'older person' because of the connotations of wisdom and status associated with the term.

[8] The North Island of Aotearoa New Zealand

explored the impact of digital technology on community, relationships, and political participation has skewed toward a focus on the experiences of younger users. Yet, this research has shown how older people navigate context collapse (Marwick & boyd, 2011) and social surveillance (Marwick, 2012). Older people participate in many different sociotechnical communities, managing appropriate performances of self-hood in different settings (Papacharissi, 2018). They make complex decisions related to managing between connected presence and absence, strategically disconnecting in order to preserve their well-being and ability to connect (Light, 2014). The figure of the connected older citizen is useful for exploring how the negotiations of network citizenship apply to the everyday lives of older people.

The notion of the connected older citizen adds to a stock of sociogerontechnological and STS literature that aims to move beyond binary use and non-use categorisations. Non-use is increasingly conceived of as an analytically limited frame. Digital technology is already a part of most older people's everyday lives in some way (Peine & Neven, 2021). Algorithmic programmes utilised in health and welfare services make important decisions that affect older people's lives and care (Beer, 2019). Consumer technologies within the community, such as automated telling machines in banks, shape older people's ability to care for themselves and to age in place. Gallistl and Wanka (2022) have suggested, based on research conducted in Austria, that older people who classify themselves as non-users of the internet actually engage with the internet in manifold ways that they do not necessarily consider and name as 'proper' usage. The connected older citizen is useful for recognising the multiplicity of ways that older people's experiences of age, care, and citizenship are shaped by digital technology. It directs attention to the manifold ways that older people participate in sociotechnical communities – consciously, because of choice or coercion (Mort et al., 2013), as well as unconsciously through participation in different community networks.

10.2.1 Digital labour on care platforms

The notion of the connected older citizen raises important question about the digital labour that older people undertake in seeking digitally mediated care. One of the specific findings of this research was that older people are using digital platforms to find practical support. On digital platforms, matches are made between two people. This often involves one party selecting the other from a list of potential options. Participating in these kinds of digital platforms required

new forms of labour. Significant labour on the self (Hearn, 2008) was undertaken to appear as an attractive option in this kind of environment. Succeeding on the platform was linked with frequent engagement and offering a visually attractive profile. This kind of labour to participate on digital platforms shapes how age and care are constituted and experienced.

Existing research argues that the way digital platforms work for caregivers reinforces racialized and classed inequalities. Ticona and Mateescu (2018), for example, found that digital platforms being used for care are often linked to social media networks for sign in and privilege users that participate in these systems. The need to create an attractive profile on these platforms disadvantages those workers who are less proficient in English. Workers reported choosing to present themselves by through adopting culturally specific displays of 'professionalism'. In practice this involved choosing hairstyles and language that were in line with white, middleclass norms. Quantified ratings systems reinforce biases because they are based on subjective opinions about workers (Ticona & Mateescu, 2018). Fetterolf (2022) argues that on platforms such as care.com the profiles that have the most engagement are privileged when search results are displayed to users. This encompasses the most active users being ranked more favourable. Similarly, the profiles that get the most attention from other users (such as page views and messages) are displayed first.

The findings of these studies about care workers experiences on care platforms resonate with the findings of my research. As the responsibility for care continues to be individualised, utilising this kind of platform will increasingly become a necessary and expected part of life for good older citizens. Based on the findings of research into caregivers' experiences, it is evident that there is significant potential for new forms of digital ageism that intersect with discrimination based on race, gender, class, ability and sexuality in these spaces. On digitally mediated care platforms, the community in which older people seek care is co-constituted by human connections (replete with existing forms of prejudice) and automated connections (whereby opaque algorithmic programmes make connections between vast amounts of data to organise information). Further unpacking how this shapes older people's experiences of care is vitally important.

10.2.2 More than human, temporally aware connected older citizenship

Time and temporality (how time is apprehended) were two important actors that influenced how digitally mediated care functioned and the kinds of digitally mediated self-care practices that older people engaged in. In the final analysis chapter, tracing the relationships between time, temporality and care highlighted many salient contradictions and complexities of how digitally mediated care functions for older people. Yet this research was notably very limited in terms of how time was used – participants were not followed over a period of time. Future research would benefit from following older people through their later years to explore how connected older citizenship shifts and changes as people and technologies age.

One of the most striking temporal dynamics present in this research was the effect of people and technologies ageing together. The experience of connected older citizenship is fundamentally more than human. Care for technology in the ethical and practical sense is a fundamental part of the life worlds of older people. A concern that study participants had regarding the technology they used related to the environmental and social impacts of technology production and disposal. This does reflect a much larger point – older people's needs, wants, values, and priorities often are not significant factors in how sociotechnical care networks are arranged. However, it is also notable that this ethical orientation to technology does not appear to be a significant focus in discussions of technological interventions for an older population. Ethical discussions related to ageing and technology often focus on privacy (Berridge & Fox Wetle, 2020). Design-informed approaches to researching age and technology, at best, emphasise the practical concerns and needs of older people and their support networks.

An orientation toward the new and the innovative characterises digitally mediated care (Neven & Peine, 2017), even as many of these interventions never move beyond the prototype (Higgs & Gilleard, 2022). López-Gómez (2015), emphasising the frictions that can be associated with new telecare devices, highlights that digitally mediated care is stymied by the desire for new solutions. Technological solutions often fail in attempts to replace existing systems or cannot be integrated into existing routines. For López-Gómez, what is needed is the development of maintenance infrastructures that care for and expand the arrangements that older people already have in place as they age. The point here is not that technical solutions are not necessary or that older people should 'make do' with arrangements that are inadequate for care. Rather, it is that we collectively should seek to expand upon what is working for older people, rather

than only look for the innovative. Almost ten years later against a backdrop of worsening climate and environmental crises, López-Gómez's point is timelier than ever.

Future research could take more than human, connected older citizenship as a starting point to let older people to imagine care differently. Such a project might utilise creative methods to allow older people to reflect on what socially and environmentally just care means to them in their everyday lives. Hypothetical participants could draw upon a range of expressive techniques (such as spoken words, written words, photography, videos, drawing, performance or painting) to visualise what future collectives of humans and technologies might look. Exploring how older people anticipate and make sense of the future is valuable for understanding experiences and feelings in the present (Lupton & Watson, 2022). The purpose of this research is not to call upon older people to 'care more' within their own lives. There are already significant demands upon older people to care – for themselves, for younger generations, and through community infrastructures (Puig de la Bellacasa, 2017). Rather, this research would seek to find out more about older people's ethical perspectives related to digitally mediated care and use this to influence policy related to digitally mediated care.

10.3 Conclusion

At the intersection of neoliberal policy and ideology and apocalyptic demography, digitally mediated care is positioned as a logical and desirable solution to the problem of ageing populations. In these sociotechnical imaginaries, digital technologies are positioned as instrumental and as non-problematic. They offer straightforward wins for all the 'important' stakeholders – older people, their communities, businesses, the state, the nation, and the economy (Neven & Peine, 2017).

Yet, care is a complex and distributed process. For an older person to live well, precise alignments of human and non-human actors (López et al., 2010, p. 77) must continuously be maintained. I have demonstrated here the many ways that care is enabled, destabilised, and constrained in the sociotechnical networks of community dwelling older people in Aotearoa New Zealand. In this research, I have approached digitally mediated care from the perspective of older people ageing in place using a range of consumer technologies such as smart phones, telecare technologies such as patient portals, and gerontechnologies such as push-button

alarms. Taking a very broad conceptualisation of care allowed me to explore the political subjectivities that digitally mediated care practices enact.

I have developed the concept of connected older citizenship as a way of describing how age and care enact a particular form of networked citizenship for older people. The state, medical companies, adult children, technologies, and technological corporations were positioned as important mediators of older people's citizenship. I have charted the implications of this form of citizenship for what it means to age well, highlighting the new social practices such as managing connected presence and absence and careful surveillance.

Digitally mediated connection as care offers practical and affective benefits. However, a focus on technological solutions for older people elides the complex ethical, economic, political, social, cultural and spiritual questions related to ageing and care (Berridge, 2017; Lehoux, 2008). Care fundamentally involves compromise and uneasy tensions. Living well for some makes living well harder to achieve for human and non-human others (van Dooren, 2014). Many of the stakeholders affected by digitally mediated care in 'developed' nations, such as those who labour to produce digital devices, are omitted entirely from sociotechnical imaginaries. Digitally mediated care, from the perspective of older people's everyday lives, is not about 'winning'. The experiences of older people ageing in place in more than human collectives involves making situated and complex decisions about which care needs should be foregrounded, when, and why. It is time for the broader cultural conversation about digitally mediated care to 'catch up' to these nuances.

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Appendices

Appendix A: Flexible Interview Schedule

1. Can you tell me how you came to use technology?

2. Let's talk more specifically about 'technology A'/ 'technology B' etc

    a. *Whose idea was it to get it?*
    b. *Why - what did you hope it would do?*
    c. *Does it do what it is supposed to?*
    d. *What kind of information does it give you?*
    e. *Who taught you to use it?*
    f. *What did you have to do to set it up?*
    g. *What does this technology need to work?*
    h. *Who does this? (e.g. who charges it? Cleans it? Pays the bills?)*
    i. *How often does it stop working?*
    j. *What do you do if there is a problem?*
    k. *What do you wish it would do?*
    l. *What concerns you about 'technology A'?*
    m. *How will you dispose of it?*

3. What types of technologies have you used in the past?

    a. *What did you do with them?*
    b. *Why did you stop using them?*

4. Are there technologies that you wish you had but don't?

Appendix B: Documents and websites list

muse: https://choosemuse.com/
How it works
Benefits
Science
Blog https://choosemuse.com/blogs/news
(search terms 'age', 'older', 'senior', 'elderly', 'older person', and 'older adult')
The difference between alone and loneliness
Now Partnering with Leader in VR for Seniors, Rendever!
The difference between alone and loneliness

Oura https://ouraring.com/
All web pages

Patient Portal 1 managemyhealth.co.nz
All webpages

Patient Portal 2 https://www.indici.co.nz/
All webpages

Apple https://www.apple.com/newsroom/
(search terms 'age', 'older', 'senior', 'elderly', 'older person', and 'older adult') iOS 12 introduces new features to reduce interruptions and manage Screen Time
Apple extends the Apple Watch experience to the entire family
Apple Fitness+ introduces even more ways to make fitness welcoming and inclusive … watchOS 9 delivers new ways to stay connected, active, and healthy

Fitbit – website https://www.fitbit.com/global/nz/home
Active Zone Minutes
Technology
Products
Fitbit – blogs + YouTube r/t older people
(search terms 'age', 'older', 'senior', 'elderly', 'older person', and 'older adult')
How to (Safely) Get Your Aging Parents to Move More
Meet the Grandma Who Can Probably Walk Circles Around You (Video!)
9 Reasons to Give Your Dad a Fitbit Tracker
Move more. Stress less. Fitbit Inspire 3

Samsung
(search terms 'age', 'older', 'senior', 'elderly', 'older person', and 'older adult')
The Best Smartphones for your Grandparents

MSD
Annual Report section: Delivering high-quality services through excellent organisational capability

Strategy for a Digital Public Service **Govt docs/reports (ageing specific)**
Better Later Life
Healthy Ageing Strategy
Govt docs (digital literacy)
Digital Literacy Training for Seniors
Digital inclusion and wellbeing in New Zealand (prepared by Motu)
Govt – health
Sponsored data scheme
Sponsored data 'info pack'
NZ Vision for Health Technology

Appendix C: Recruitment notice

Using technology to support older people at home

Participants needed

I'm Lisa Vonk, a doctoral student from Massey University. I'm looking for volunteers to take part in my research. My research is about how technology is used to support people aged 65 and over that are living at home.

I am interested to talk to older people (65 +) living in the community that use technology to manage health, keep in touch, or stay safe.

Some examples of the types of technologies I am interested in are: smart phones, smart watches, fitness trackers, smart home systems (like Alexa), computers, and iPads.

I am interested to know what kinds of things you use these technologies for, and it may be useful to see how you use them.

The interview would last for 45 – 60 minutes.

As a thank you for your time, you will receive a $30 gift card .

You can ask me any questions by emailing REDACTED or ringing REDACTED

This project has been reviewed and approved by the Massey University Human Ethics
Committee: Southern B, Application SOB 20/41. If you have any concerns about the conduct of this research, please contact Dr Gerald Harrison, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83570, email humanethicsouthb@massey.ac.nz .

Appendix D: Ethics approval

From: humanethics@massey.ac.nz <humanethics@massey.ac.nz>
Sent: Monday, 7 December 2020 4:24 PM
Cc: Human Ethics <gmhumeth@massey.ac.nz>; Goodwin, Ian <REDACTED>; Breheny, Mary <
REDACTED >; Taffel, Sy < REDACTED >
Subject: Human Ethics Application SOB 20/41 Approved

HoU Review Group

ReviewerGroup
A/Pro Mary Breheny
Dr Ian Goodwin
Dr Sy Taffel

Researcher: Ms Lisa Vonk
Title: Ageing in the smart place: The impact of networked, digital technologies on community care relationships

Dear Lisa

Thank you for the above application that was considered by the Massey University Human Ethics Committee: Human Ethics Southern B Committee at their meeting held on 07/12/2020. On behalf of the Committee I am pleased to advise you that the ethics of your application are approved.

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.
If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

If you wish to print an official copy of this letter, Please logon to RIMS (http://rims.massey.ac.nz), and under the Reporting section, View Reports you will find a link to run the Ethics Committee Report.

Yours sincerely
Professor Craig Johnson
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Appendix E: Information letter

School of Humanities, Media and Creative Communication

Private Bag 11 222

Palmerston North, 4442, New Zealand

Ageing in the smart place

The impact of digital technologies on community care.

My name is Lisa Vonk, and I am a PhD student in the School of Humanities, Media and Creative Communication at Massey University.

As part of my doctoral studies, I am undertaking a research project exploring how networked, digital technologies impact older people living in the community and the relationships they are involved in.

Networked, digital technologies include devices like personal alarms, smart phones, iPads, lap tops, personal computers, video camera systems, smart home system systems (like Alexa or Google Home), wearable devices (like a FitBit) and the software programmes and applications that run on them. These may be

designed for care (like Geneva's My Homecare or a medication tracking app), marketed as 'for' older people (like a personal alarm), or be forms of social media (like Facebook Groups).

I would like to conduct interviews with older people and the people who support them to find out about the types of technologies they use and the ways they use them. You are receiving this information because you responded to an advertisement indicating that you use networked, digital technologies to manage health, keep in touch, or stay safe.

If you choose to participate, you will take part in an interview lasting 45 to 60 minutes. You can choose to be interviewed by yourself, or with a support person. Your time and generosity will be acknowledged with a
$30 prezzi card.

The interview can take place anywhere you choose. During the interview, I will ask you to describe the networked digital technologies you use. I will ask you to show me how you use them. I might ask to photograph the technology. I won't use or record any of the personal information you store on these devices. I am interested in how you use them rather than in collecting personal information. You can choose not to answer any question. You do not have to allow me to take photographs.

After the interview, if you are comfortable, I will leave you with information about the study that you can give to friends, family, or neighbors that use technology as part of their relationship with you or to people you think might be interested in participating. This is not compulsory.

I will use the information you provide me to gain an understanding of how these technologies impact older people living at home and the relationships they are involved in.

You will not be able to be identified personally in publications associated with the research. No names, family names or place names will be used in any written documents or presentations. All data will be kept confidential and separate from any identifying information in a secure location.

At all times, you have the right to:

- decline to answer any particular question
- withdraw from the study at any point before, during, or 2 weeks after the interview
- ask any questions about the study at any time during participation
- ask for the recorder to be turned off at any time during the interview
- refuse the researcher's request to take photographs
- provide information on the understanding that your name will not be used
- be given access to a summary of the project findings when it is concluded.

Please consider this information carefully before deciding whether or not you would like to participate. You are welcome to ask questions or withdraw from further contact by email REDACTED or phone REDACTED

In a few days, I will contact you to answer any further questions. Once you have had a chance to consider participation, we can make a time to for an interview.

As a doctoral student, my work is closely supervised by three experienced academics. You are welcome to contact them at any time with questions or concerns about the project:

Associate Professor Mary Breheny	*Dr Ian Goodwin*	*Dr Sy Taffel*
REDACTED	REDACTED	REDACTED

Thank you very sincerely for your time and interest.

Ngā mihi nui,

Lisa Vonk

BN, Grad Dip Media Studies, MA

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application SOB 20/41. If you have any concerns about the conduct of this research, please contact Dr Gerald Harrison, Chair, Massey University Human Ethics Committee: Southern B, telephone 06 356 9099 x 83570, email humanethicsouthb@massey.ac.nz

Appendix F: Participants List

Pseudonym	**Age range**	**Living situation**	**Significant* human actors in sociotechnical care network**	**Significant* devices in sociotechnical care network**
Alan	70-80	Town; Private dwelling; Lives with spouse	Spouse, adult children, grandchildren	Tablet, smart phone, PC, smart television, eBike
Beth	70-80	City; Retirement village; Lives alone	Adult children, grandchildren	Tablet, smart phone, laptop
Corrina	70-80	Town; Private dwelling; Lives with adult child	Adult child, brother-in-law, a friend group	Smart phone, laptop, tablet
Daphne	70-80	Town; Private dwelling; Lives alone	Adult children, family doctor	Smart phone, PC
Geraldine	70-80	City; Retirement village; Lives with spouse	Spouse, adult children, grandchildren	New smart phone, old smart phone
Hilary	65-70	City; Private dwelling; Lives alone	Mother, father (deceased), sister, adult children	Smart watch, laptop, various exercise sensors/trackers, smart phone
Ian	70-80	Rural town; Private dwelling; Lives with Spouse	Spouse, home stay participants	Smart phone, PC
Janet	70-80	City; Private dwelling; Lives alone	Sister, adult children, friend, grandchildren	Laptop, smart phone

John	70-80	City; Private dwelling; Lives with spouse	Spouse, adult children, friends	PC, smart phone
Keith	70-80	City; Private dwelling; Lives alone	Virtual communities	Various self-tracking and sensing devices, PC, smart phone, tablet, VR headset
Mary	70-80	City; Private dwelling; Lives with spouse	Spouse, adult children, friend group	Smart phone
Mitch	70-80	City; Retirement Village; Lives alone	Close online friend, online communities	PC, push button alarm
Tina	70-80	City; Private dwelling; Lives with brother	Brother, sister, church community, friend group, GP	PC, laptop, smart phone
Trevor	70-80	City; Private dwelling; Lives with spouse	Heart specialist, doctor, spouse, adult children, brother	Smart watch, smart phone, PC
Vera	80-90	City; Private dwelling; Lives alone	Friend group, community group, adult children, grandchildren	Landline, laptop, smart phone, tablet
Viola	80-90	Rural town; Private dwelling; Lives alone	Church group, neighbours, adult children, grandchildren, spouse (deceased)	Laptop, smart phone, tablet

*This does not represent all of the people and devices in participants' lives but an indication of those that were identified by the researcher as notable for care – such as those actors requiring care or being a crucial part of achieving care.