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Chapter 3

Fragile robots and coincidental innovation

Turning Socio-gerontechnology
towards ontology

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Introduction

In the last decade, a central topic of debate in Science and Technology Studies (STS) has concerned a 'turn to ontology' (Callon and Law 1982; Woolgar and Lezaun 2013). The ontological turn in STS can be defined as a focus on the nature and character of entities in the world and an interest in the question of how such entities can be explored and analysed, while taking into account that the act of exploring and analysing participates in performing the world (Winthereik 2015). While there are many versions and positions on the matter (Jensen et al. 2017), we will not explore these variations extensively here.

In this chapter, we ask instead what an ontological study of ageing and technology may be, and we explore the possible relevance of the approach for the emerging domain of Socio-gerontechnology. We draw on ethnographic material generated during our participation in the Danish public–private innovation project Live Well,[1] which aimed to develop care technologies to enhance the social, physical and mental activities of older people by bringing together universities, companies and associations. This aim is much in line with the current European innovation discourses, which figure older people and their decline as a core problem in need of innovative, technological solutions (Moreira 2017). We analyse the situated innovation process within this project – looking specifically at the emergence of two different prototypes, a telenoid robot and modular interactive tiles. Before analysing these cases, we unfold central themes and analytical reference points from STS and Age Studies, which are central to our analysis. We suggest that the attention to matters of ontology can stimulate a renewed mode of reflection in Socio-gerontechnology and invigorate the discipline's push towards producing alternative knowledge.

The ontological turn in STS

The approach to ontology in current STS research differs substantially from the philosophical approach, which aims to explain reality. In contrast, the ontological interest in STS is more concerned with how entities such as humans, material

objects and categories co-emerge in situated practices. The interest is in the active construction of worldly phenomena, in particular social and material practices – a performative view. These ideas are to a large extent inspired by actor-network theory and the emphasis on relationality (that things, humans and non-humans achieve their agency as an effect of their relations to other entities in distributed networks) (Latour 2005). Nothing acts alone as a detached or stabile entity. Ontologies are seen as situated in practice, and hence the terms 'practical ontology' (Gad et al. 2015) and 'empirical ontology' (Law and Lien 2013). If entities emerge in relation to other entities in practice, this means that phenomena such as ageing or technology differ in different situations. Such understandings have led to intriguing studies that render objects that are usually perceived as fixed, coherent and objective as multiple, distributed and ontologically variable (Mol 2002; Gad et al. 2015). Obviously, this has implications for researchers who cannot claim anymore to describe an externally existing world where things have one true nature. If things emerge in practice, then that also means that the research practice (observing, theorising and analysing) becomes a participant in performing the world under study. The less obvious question is how to deal with that fickle and uncertain nature of the worlds we study? And if social science cannot claim to discover and explain the structures and dynamics of a social reality existing independent of research, then what is its purpose?

Annemarie Mol (1999) introduced the term 'ontological politics', to capture the point that all engagements with the world, including scientific, take part in enacting the world in particular ways, with specific political implications. This has marked a shift from an orientation towards making better, more correct, or more nuanced accounts of the world, to consider the normative and interventionist potentials of research, and its investments in ontological politics. Authors Woolgar and Lezaun (2013) have argued that the point of ontological enquiry

> is not to arrive at better formulations of the reality of the world or of the ways in which the world is real, but to interfere with the assumptions of a singular, ordered world, and to do so by respecifying hefty metaphysical questions in mundane settings and in relation to apparently stabilized objects.
>
> (p. 323)

In relation to studies on ageing and technology, the aim of ontological accounts can be to interfere with policies that figure older people in singularising and stereotypical ways through notions such as 'the senescent', 'the silver tsunami' or 'the grey gold' (Mort et al. 2013). According to Law and Lien (2013), ontological enquiry is a method of making visible otherwise absent realities by 'drawing attention to a penumbra of not quite realized realities' (p. 363). Otherness is a central concern here: 'it is time to attend not just to ontologies enacted but also to their shadowlands of alterities; it is time to attend to the textures of the margins' (Law and Lien 2013, p. 373). In their study of fish-farming practices, Law and

Lien study how some salmons are smoothly (although never effortlessly) part of farming practices while others become 'the losers' – that is, those that do not eat or digest properly and hence grow slowly. Specific fish tanks are allocated for such salmons at the margins. It is these margins, 'the shadowlands of alterities', which Law and Lien propose for empirical ontology to study because it is not only through the salmon but also through the not-quite salmon that we challenge and destabilise fixed categorisations that conceal variations and difference.

The prototypes we analyse in the following sections can be seen as such not-quite gerontechnologies. While such prototypes are embedded with hopes about scaling and widespread adoption, it is worth noting that most of them never reach beyond the prototype stage (Ertner 2015). Prototypes are examples of such shadowlands of alterity in regard to gerontechnologies – as they entail multiple potential realities of ageing, care and technology, most of which never make it beyond prototype-state. We use the notion of 'shadowlands of alterities' to explore these alternative realities. Moreover, we find inspiration in the ontological aspiration to 'interfere with the assumption of a singular and ordered world' (Woolgar and Lezaun 2013). This we find highly relevant in the domain of ageing and technology, where healthcare policies and innovation discourses and practices tend to produce generalised images of ageing and older people as a problem, and present innovation and technology as the logical solution to those problems. We wish to interfere with such reified ideas of older people as fragile and vulnerable, and the teleological beliefs in technology and innovation as solutions. In the following sections, we will use our ethnographic data from the innovation project to tease out other stories. But before exploring our cases, we will briefly introduce how previous studies of ageing and technology have dealt with matters of critique and intervention.

Modes of reflexivity in studies of ageing and technology

Other modes of reflexivity have characterised previous studies of ageing and technology in STS and Age Studies. STS-inspired studies often focused on studying how certain technologies 'fit' to the actual world of older people (Östlund 2004). The gaps between older peoples' practices and the technologies offered to them have been described as a 'digital divide' (Jæger 2004) and have led to studies on the suitability of technology for the older users in case of personal alarm systems, safety phones (Hyysalo 2004), ageing-in-place technologies (Neven 2015) or service robots (Neven 2010). These approaches tend to engage with the experiences of older people and the effects of technology on their lives. Reflexivity in these accounts has to do with examining what *actually* happens in socio-technical practices, as opposed to what dominating discourses claim that happens. This string of research has been seminal in examining the ways technologies can be better suited to the lives of older people. Such accounts

have been valuable in terms of showing the potential negative effects of technology. However, they entail a risk of producing a different, but equally reified, image of older people and technology. Exploring resources from STS on ontology, we will try to move in another direction than the questions of 'fit' between older people and technology. We want to avoid seeing technology or 'older people' as singular, detached and fixed entities and explore a different kind of tale about ageing and technology and a different mode of interfering with dominating discourses. To do so, we start out from a position of not knowing in advance what technology or the older user is but explore how these terms take shape through situating analysis. With this, we wish to depart from newer terms used to describe older users – such as 'innosumers' (Peine et al. 2014), 'early adopters' (Peine et al. 2017) or 'technogenarians' (Joyce and Loe 2010). While such terms have been significantly fruitful in breaking with the ageist ideas of older people as retrogressive towards new technologies, they also risk creating new and equally problematic stable categories.

In Age Studies, another frequent form of critique regarding 'the new old age' stems from critical gerontology (Biggs and Powell 2001; Katz 1996). From this perspective, the problem is not retrogressive older people but rather that the ideal retiree is formed through a neo-liberal logic constantly focused on health and activity. This reverses the argument and posits successful ageing as post-ageist ageism (Marshall and Katz 2012) supported by unarticulated, normative values and assumptions about old age which need to be resisted (Holstein and Minkler 2003). In this line of thought, the 'innosumer' and the 'technogenarian' can be subjectivated to perform a suppressing imperative of constant activity and innovative engagement with technology. With the ontological focus, we wish to explore other possibilities of critique than those proposed by such accounts.

We wish to explore what other worlds of technology and older people could be possible and open Socio-gerontechnology up to other modes of reflexivity and different possibilities of critical engagement with technology. While other scholars on the intersection between STS and Age Studies have, in similar ways, explored how technology and old age co-constitute each other (Peine and Neven 2019) or co-emerge in different ways (Gómez 2015), we directly approach this issue as a matter of ontology.

In the following sections, we use the ontological turn as a starting point for telling empirical stories about technology and innovation that differ from how these things and processes are usually portrayed. Our aim is to mobilise our ethnographic data in ways that allow us to tell stories that go beyond dominating often invisible and common-sense ideas about innovation and relations between technology and older people. We also try to be very explicit about this normative agenda and use it not as a bias to be reduced but as a capacity to make more deliberate choices about what realities to re-present, designing our analytical accounts in ways that are conscious and reflexive about how they may intervene in the worlds they are about (Winthereik and Verran 2012).

The telenoid – a materially stable, but ontologically fragile, robot

This is the workshop we have all been waiting for. The previous months of collaborative project activities have concerned everything else than the actual design of prototypes, which has been going on backstage. But today finally the prototypes, which the designers have been working on, are to be revealed to all project partners. Being an ethnographer in the project, my activities have taken place far away from the design labs located in various places, and as such, the design of prototypes has so far been an invisible process for me and the other non-designer project partners. I, and other project partners, enter the big workshop room where prototypes in different material forms and degrees of completion are exhibited along the walls. Posters and sketches make out the prototypes that are being presented. One in particular catches my attention. I frown as I look at the computer screen that shows an animation of a robot, which I later find out is called a Telenoid. The creature depicted is a white torso, small, like a young child, with a bald head and stumps in place of arms. It has no legs. Instead the 'body' ends in something looking like a short tail. The screen portrays the white Telenoid hovering in a black universe. Its dark eyes are looking disturbingly real as they stare straight out at the viewers. The features are clearly humanoid, but it looks as if it has not fully developed into a 'finished' human form, a disrupted human development, similar to a pre-natal exemplar of some unknown human-like species. The white hovering appearance on a black background brings forth images of a ghost in the night or an alien from a foreign galaxy. Is it human or other-than-human? Dead or alive? Foetus or fully developed? Friend or enemy? The peculiar appearance and indefinable character of this artefact, resembling a weird sci-fi creature, both disconcerts and fascinates me, and I am left unable to settle on how I should think about it. The robot, appearing in the workshop as a finished high-tech object, is at once a symbol of innovation and a materialisation of a highly contested and controversial notion of care and sociality. I recall the many images I have seen in television and magazines of shiny robots coupled with promissory headlines such as about how robots will fight loneliness and rescue societies from population ageing. Sci-fi movies about fatal futures of robotic invasion run through my head and spark a little fear, which turns into contempt at the sight of this odd-looking artificial creature.

The prototype has caught other people's attention too, and I hear people around me whispering upset comments about the Telenoid. Telling glances between project participants and low voices whispering in disgrace indicate that the Telenoid is not in favour in this crowd. One person utters loudly, 'I don't support this kind of technology at all!' and I silently share her disapproval.

(Excerpt from Ertner's fieldnotes from a workshop
during project Live Well)

The appearance of the Telenoid on posters

There are several characteristics of the Telenoid presentation that vary from the other presentations in the workshop and set it apart as radically different. Where

other posters show images of smiling older people engaged in healthy social and physical activities, supported by technologies that are instrumental tools acting in the backstage, the Telenoid is frontstage. What is made present is the very relation between an older person and the Telenoid and the intimate social relation between the two. The relation between the Telenoid and an older person is the central theme on the poster, which hangs on the wall behind the computer screen animating the hovering Telenoid. One photo on the poster shows an older man sitting across from the Telenoid, one of his hands touching its cheek and neck as in an intimate conversation or a caress. Underneath is an image of a woman holding the Telenoid with two outstretched arms. There is eye contact, and the position is akin to a mother's playful interaction with her baby. Both the poster and the screen emphasise the humanoid qualities of the robot: fingers that caress, eyes that seek contact, arms that hold, an entity that has body-weight and height, facial expressions and a body that moves and gestures. The Telenoid cannot stand on its own but depends on humans to lift it up, hold it and carry it around. The boundaries between human and technology are destabilised. The robot is an object of sociality, not a facilitator, but a companion in an intimate, personal and profoundly social situation. It becomes unclear from the photos who needs whom and who is helping whom.

Another version of care?

This presentation of the relation between the human and the robot distinguishes the Telenoid from the other prototype presentations by presenting a strikingly different version of care. Other prototypes are presented through a narrative about the design process from the discovery of user needs towards the invention and design of the prototype that will meet those needs. The designer is presented as someone driven by sympathy for the older users and the motivation to solve their problems. A core value is sympathy, and care emerges as the sympathetic and resourceful act of helping someone in need. This sympathetic act of caring for older people involves a clear distribution of agency and power, with the designer as the agential helper and the older person in the subordinate position of the powerless receiver of help. Such a problem–solution narrative is absent in the presentation of the Telenoid, and the moral universe seems far from based on values of empathy with needy older people. To stir insecurity, questioning the very boundaries between the human and the non-human, the familiar and the alien, seems to be exactly the purpose of this design and the staging of the Telenoid. On the computer screen, it appears at once scary and enchanting, puzzling and enigmatic and quite impossible to define with common categories. Provocation and enchantment seem to be values in their own right. Care, as depicted in these photos, is not a service provided unidirectionally from an empathetic caregiver to a needy care receiver. Care emerges as a mutual relation between two beings that both give and receive care in an equal exchange of affection and interest.

   The finished look of a completed robot design signalled superiority over the other prototypes presented in the workshop. They barely had material shape and figured only in hand-drawn sketches and simple posters. Interestingly, despite the material robustness and high degree of material and conceptual completion of the Telenoid compared to the other prototypes, the Telenoid was the first one to be rejected by the project participants. The reactions in the room were harsh, critical and emotional. In the cultural context of a Danish user-driven design project, based on a long historical tradition of participatory design and norms of empowerment, user involvement and empathy with vulnerable users (Ertner 2015), the Telenoid was encountered as an object of technocentrism and engineering arrogance. The friction in the room, as well as my own 'disconcerted' emotions (Verran 1999) for the prototype, became a starting point for the analysis.

Different types of technology critique?

What is made present in this story about a Telenoid robot? We encounter a robot that appears in the text not as a singular object but as a collection of various loosely attached entities. Analysed ontologically, the Telenoid consists of things such as posters, photos, text, screens and ideas and concepts of older users, of care and so forth. Through this analysis, the Telenoid appears in deeply intimate, affectionate and embodied relations with older people. Thus, the Telenoid appears as affectionate, intimate and sensuous and, all in all, as a 'humane' figure. But the ethnographer's initial feelings of contempt and fear also become part of the analysis. Following the ethnographer's changing feelings for the prototype shifts the critical lens in the story from an initial scepticism over a robot for its alleged effects of 'de-humanising' care to an appreciation of the way in which it conveys care as an intimate, reciprocal relation. For the ethnographer, engaging with the material appearance of the Telenoid, as well as engaging with her own embodied reactions, made change possible. Despite the initial contempt for the Telenoid, the ethnographic account ends up elsewhere. Analysing the Telenoid in the workshop, where critical voices of spectators slowly de-legitimised and dis-assembled it as a project prototype, reveals the fragile existence of a care robot and presents a critique of the cultural values and notions of care inherent in Danish approaches to technological innovation in eldercare that were performed in the workshop.

   This story engages with the 'shadowland of alterities' in the case of gerontechnologies by showing the processes of sorting 'good prototypes' from 'bad prototypes'. The Telenoid was rejected as a project prototype. Its mode of relating to the user through enchantment, intimacy and mutual care was not valued within the project, where other cultural ideas of human–technology relations were at play. Alterity, or otherness, also refers to the way in which the story evokes the robot as fragile. This image of robots is radically different than how the hyped and fear-inducing discourses figure robots as an inevitable force destined to come and take over the human role in care. Our critique instead pertains to particular cultural values inherent in Scandinavian approaches to innovation and care technology

development, which the 'otherness' represented by the robot, helped to make visible. Attention to the ontological shadowlands of ageing, technology, innovation and care is one way in which Socio-gerontechnology can explore new forms of critique through nuanced, reflexive and non-essentialising stories.

Modular tiles – a solution in search of a problem, a user and a world

The prototypes developed in project Live Well had oftentimes been developed for years prior to the project. Often, these prototypes were technologically advanced, but through their long development processes, their purposes became unclear. In this section, we will explore the trajectory of the coming into being of a particular prototype, the modular tiles. This story does not tell us of innovation as a linear, systematic and controlled process of discovering user needs and developing the right solutions but as a range of more or less coincidental events and encounters and a finished prototype lacking a problem to solve. When the modular tiles were first introduced at a workshop during the project Live Well, they were introduced as one of many prototypes developed by designers from a technical university and an overlapping private robotics company. The researchers/entrepreneurs showcased different prototypes that were not necessarily targeted at older people initially but which were expected to enact a better old age through their promises of increased social or physical activity or both.

The tiles look like large puzzle pieces (roughly 30 cm × 30 cm × 3 cm), and put together (e.g. in a square with 4 × 4 tiles) they constitute a game board, where the user plays different games that involve stepping on the tiles. Depending on the game, the tiles light up with different colours. In one game, the users play memory, remembering the colour in which the tiles lighted up; in another, the users compete against each other on how quick they can step on the tiles as they light up. The games vary in difficulty according to the functional and cognitive abilities of the users. As we will show, the users and problems, as well as the technology's justifications, differ according to the practices through which they emerge.

From children's toy to rehabilitation technology

Initially, the designers developed the tiles as an innovative way of integrating the floors on children's playgrounds as part of the toys (Lund and Marti 2009). However, the technology proved too expensive for such use. While many different actors were enthusiastic about the technology, the applicability and future of the tiles were uncertain. The children's toy was put in a drawer. The technology had been developed and the prototype looked finished and ready to go but with crucial deficiencies: no problem it could solve, no user it could address and no network to become part of. The tiles were a solution in search of a problem (cf. Pols 2010). The tiles needed to search for new possibilities of emergence. When

the designers entered Live Well, the tiles were reinvented through spontaneous alignments between project partners.

At the workshop during Live Well, quickly, the focus of the participants was mostly on the tiles, as these seemed to embody the project's ambitions of playful togetherness. In particular, a fitness centre director was eager to see if the tiles could be used in the fitness centres. A merge of specific interests occurred – where the technology of the university/company, the business model of the fitness centre and the potential users of Live Well were aligned (Lassen et al. 2015). This trinity enacted a potential old age – where older people's needs and potentials for playing, togetherness and functional capacity could be addressed and solved by the promise of a prototype.

With the interest from the workshop participants, and that of the fitness centre director in particular, the prototype was envisioned to solve the problems of older persons undergoing retraining programmes focused on strength and balance. As such, the tiles were re-imagined as a rehabilitation technology and the users as fragile older people in need of physical rehabilitation. A particular kind of old age and technology was in the making. When the tiles shifted potential users from being children to being older people, they also entered a different politics.

Tiles on trial: a new user requires new justifications

At a later workshop involving older people as prospective users, the participants were dancing on the tiles and laughing. The tiles were a playful technology that created fun and togetherness. But something else happened when the inventors of the tiles decided to strategically target older people in rehabilitation programmes. The requirements of the purpose and effects of the technology changed. In terms of the purpose, while the inventors envisioned the tiles enacting a playful old age, they also suddenly became a means of restoring functional capacity. The tiles gamified rehabilitation (Nielsen and Lund 2012) but, through this move, also medicalised playing. This produced a politics of potentiality (Taussig et al. 2013), where the current state of a given citizen is a constant object of improvement and enhancement. The key to such potentiality is the 'regime of technoscientific promises' (Felt et al. 2007) that promises technological fixes for obstructing or reversing the declines of old age.

By participating in the production of a politics of potentiality, the effects of the technology needed to be justified by hard evidence. If fitness centres (and municipalities later on) were to invest in the technology, the university/company needed to demonstrate that the technology improved functional capacity and was more than a toy that facilitates fun and togetherness. While promising a fun old age could rely on personal experiences with the tiles from workshop participants and anecdotes from older people, promising functional capacity relied on another kind of evidence. Hence, in collaboration with a municipal retraining centre, the researcher/designers organised a small-scale randomised trial in the spring of 2012.

The retraining centre gathered 18 community-dwelling citizens aged 63–95 years with varying degrees of functional capacity to participate in the study. The participants were found amongst previous participants of the retraining programmes in the facilities, and most were well known to the physiotherapists organising the trial. All the participants had problems with mobility and balance, which the tiles were expected to improve. After inclusion and baseline tests, participants were randomly selected for the control and intervention groups.

As Lassen followed the trial during the spring of 2012, it became increasingly clear that the tiles had difficulties bridging the gap between a fun, playful technology and a medicalised 'training-for-rehabilitation' technology. While the tiles at the workshops and in the narrative of the researchers/entrepreneurs were effervescent, light and playful, the participants in the trial were serious, quiet and looking for concrete and immediate effects from the training with the tiles. The effects of the technology were situated in practice. After the first session, a male participant was disappointed: 'I can't feel my balance improving. In fact, I can't even feel they stimulate the balance centre', he stated. When the tiles became part of a trial, they were medicalised, and participants expected immediate results.

In 2019 the tiles are used for a range of purposes and are embedded in practices of rehabilitation, prevention, games and sports. While this bridging of different practices might seem effortless, what we have tried to show is that the assembling of such a technology requires its ability to produce different effects drawing on different kinds of justification. And in this production, it is not just the effects and justifications that differ but also the politics, practices and worlds through which the technology emerges.

What we have seen is the co-emergence of a particular technology and a particular old age. Our story of the tiles highlights innovation as a process of unco-ordinated, sometimes coincidental, events and encounters. Thus, we seek to show an alternative reality of innovation than the classic tale about technology as a solution to older people's problems and innovation as a linear process of discovering such problems and designing technological solutions. Here, the plot is turned upside down; instead of telling about the effects of technology for older people, we showed how innovation is situated, coincidental and distributed.

An ontological turn in Socio-gerontechnology?

We have proposed an ontological turn in Socio-gerontechnology as a particular commitment to see entities such as ageing and gerontechnologies as emergent in practice and thus to write and craft research accounts in ways that renders this visible.

This opens up to a mode of reflexivity regarding ontological matters of concern – which has, until now, not been familiar to studies of ageing and technology. Where such studies have offered critical, rich and situated perspectives on the relations between older people and technology, the capacity of breaking with existing, dominating and potentially stigmatising views can be taken even further. In our analyses of the Telenoid and the tiles, we attempted to tell stories that refuse

to settle on stereotypical and reified ideas of innovation, gerontechnology and older people. The analyses sought to intervene in typical innovation narratives about design and technologies as grand solutions to society by engaging with the 'shadowlands of alterity' of technological prototypes and innovation practices. Exploring the emergence of the Telenoid and the tiles as 'not-quite-yet' prototypes rendered them not as *one thing* but as an arbitrary collection of loosely detached entities and events. Following their ontological flickering between being- and not-being project prototypes, the Telenoid and the tiles appeared sometimes as finished technologies and at other times as ontologically vague, with uncertain agency.

Letting our own embodied reactions and relations to the empirical field become part of the analysis, such as in the case of the Telenoid, worked to craft a story that never really settles on a single politics of gerontechnology and innovation but shows different possibilities. This ability to move the perspective and affective temperature within the same text may open up to stories that facilitate the reflection and acknowledgement of difference rather than generate static opinions.[2] This, we believe, is an important purpose of ethnographic research in ageing and technology. If there is not one truth about the nature of or relations between technologies, ageing and older people, as the contributions in this book show, then the challenge for socially sustainable research and technological development is the ability to embrace and handle ontological complexity.

Notes

1   The project was called *Lev Vel* in Danish, *Live Well* in English, and aimed to develop digital and social solutions to enhance the quality of life for older people. It was organised as a collaborative partnership with partners from industries and research and public institutions.
2   See also Winthereik and Verran's (2012) study on generative ethnographic stories.

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