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Science, technology and the 'grand challenge' of ageing—Understanding the socio-material constitution of later life

Alexander Peine [a,*], Alex Faulkner [b], Birgit Jæger [c], Ellen H.M. Moors [a]

[a] Innovation Studies, Copernicus Institute of Sustainable Development, Utrecht University, P.O. Box 80115, 3508 TC Utrecht, The Netherlands
[b] Centre for Global Health Policy, School of Global Studies, University of Sussex, BN1 9RH, Brighton, UK
[c] Department of Society and Globalisation, Roskilde University, Universitetsvej 1, 4000 Roskilde, Denmark

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ABSTRACT

In this paper, we introduce the themes addressed and the approaches used in this special issue. We start by briefly discussing the state of the art in research and policy making related to science, technology and ageing. We argue that an important gap characterizes this state of the art: current approaches do not consider material practice and materiality to be an inherent part of later life as constituted in contemporary societies. Science and Technology Studies (STS) provide both the theories and methods to address this gap, and thus deploy a theoretical and empirical understanding of science, technology and ageing that captures how later life co-evolves with the practices of technology use and design. We briefly discuss how the articles in the collection each contribute to such an understanding across various locations. We conclude that, together, the contributions specify a perspective on the *socio-material constitution of later life* that implicates an important agenda for the future study of ageing and gerontechnology innovation.

1. Introduction

Demographic ageing is widely seen as a major challenge that drives the future of science and technology policy and management in industrialized societies (Grübler et al., 2007; Phillips, 2011; Schuitmaker, 2012). In Western Europe, the population aged 65 or higher will increase from 18.5% in 2010 to 27.3% in 2035, and the population aged 80 or higher will increase from 5.1% to 8.6% in the same period.[1] A common reasoning among policy makers, companies, researchers and lobby groups suggests that this demographic disruption will lead to a crisis for healthcare systems, for pension schemes, for the innovative capacity of economies, and for the social relations between different age groups (Nye, 2009). Science, technology and innovation are widely perceived to provide the means for solving this "grand challenge" of demographic ageing (Östlund, 2004; Mort et al., 2012; Neven, 2011; Peine and Herrmann, 2012; De Smedt et al., 2013; Cagnin et al., 2012). In the EU, for instance, the Ambient Assisted Living Joint Programme has funded research and development into ICT-based solutions to support active and healthy ageing with about 700 million EUR since 2008; an additional 143 million EUR were funded through the FP7 programme on "ICT for Health and Ageing Well" in 2013 alone.[2]

At the same time, the nature of later life and its relation with science and technology is changing. Current generations of older persons have experienced different waves of new household technology innovations during their life course; and with the baby boomers,[3] the first cohort that has been

* Corresponding author. Tel.: +31 30 2532782.
E-mail address: a.peine@uu.nl (A. Peine).

[1] Source: UN World Population Prospects (2012 Revisions): http://esa.un.org/wpp/.

[2] See http://ec.europa.eu/digital-agenda/en/active-and-assisted-living-joint-programme-aal-jp and http://cordis.europa.eu/fp7/ict/programme/challenge5_en.html.

[3] The term baby boom usually refers to the exceptionally high birth rates after World War II that occurred in Wester European (and North American) countries. While the timing of the baby boom has been slightly different in these countries, we use the term baby boomer to describe those born between 1946 and 1964.

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exposed to modern digital technology, at least in the later phases of their lives, is going into retirement (Sackmann and Weymann, 1994; Mollenkopf, 2003). The baby boomers are also the first cohort that has been enculturated into consumer lifestyles, which implies that many of them continue to express their life styles and develop identity through the use and consumption of technology well into old age (Joyce and Mamo, 2006; Jones et al., 2008; Higgs et al., 2009; Gilleard and Higgs, 2011). In other words, older persons are increasingly used to use technology as part of everyday culture. As Loe has recently pointed out: Even the oldest old of today "can be and are technogenarians in their active use of everyday technologies to create meaningful lives and maintain health" (Loe, 2010, p. 320).

Innovations for older persons are usually referred to as *gerontechnologies* (Graafmans et al., 1998; Charness and Schaie, 2003; Joyce and Loe, 2010; Sixsmith and Gutman, 2013). They are not only seen as a potential solution to the problems and challenges associated with ageing; they are also perceived to have a considerable potential to open new market opportunities for innovative companies (Kohlbacher and Herstatt, 2011; Gassmann and Keupp, 2009) and scientific enterprise, and to provide learning opportunities, new experiences, enablement or simply fun for older persons (Astell, 2013; Larsen et al., 2013). Gerontechnological innovations are embedded in a "triple-win narrative", where policy makers, innovators and older persons are said to equally benefit from scientific and technological innovation (see Neven, 2011, 2014). So far, however, the realization of this triple-win has remained disappointing (Gassmann and Keupp, 2009; Kohlbacher and Hang, 2011; Sixsmith, 2013; Östlund, 2011; Botero and Hyysalo, 2013).

This special issue focuses on a pertinent reason for this disappointment: The current generation of older persons creates "new patterns for life in the space between […] the 'main acts' of adulthood (career- and family-building) and the frailties of old age" (Moen and Spencer, 2006: 133). It has remained challenging to address these new patterns in innovation processes (Sixsmith, 2013; Lawton, 1998; Fozard et al., 2009; Wahl et al., 2012). Ageing baby boomers are different from younger users in terms of the needs that arise from ageing bodies (Twigg, 2004; Brooks, 2010; Czaja et al., 2013); they have undergone different technological experiences during their lives (Docampo Rama et al., 2001; Fozard and Wahl, 2012; Sackmann and Winkler, 2013); they are apt to reject technologies that too overtly position them as frail and old (Neven, 2010; Bailey et al., 2011; Jæger, 2005a); and they rearticulate meaning and identity as they move into later life with new and existing technology (Gilleard and Higgs, 2011; Mollenkopf et al., 2011; Chapman, 2006). Yet they often also defy existing stereotypes of inept and vulnerable technology users that are set apart primarily by the problems they have in engaging with science and technology as passive recipients (Joyce and Loe, 2010; Brittain et al., 2010; Östlund and Linden, 2011; Loe, 2011). As technology users, current generations of older persons are characterized by a simultaneous need to create new patterns of meaning and sense of self for retirement and later life on the one hand, and to cope with emerging illness and frailty on the other (Peine and Neven, 2011; Peine et al., 2014). Failing to address this simultaneous identity as agents and recipients of scientific and technological change constitutes a risk to produce a triple loss—older persons do not get the technologies they need, companies fail to tap into the opportunities of the emerging silver market, and the government subsidies for gerontechnological innovations result in prototypes and experiments that do not spread or scale.

2. An STS contribution to science, technology and ageing

Against this background, it becomes clear that ongoing policy discourses tend to express an overly instrumental view on technological innovation: Science and technology are positioned as solutions to otherwise independent problems that exist in the domain of individual and demographic ageing (Mort et al., 2012; Xie, 2003; Jæger, 2005b; Roberts and Mort, 2009; Oudshoorn, 2011). For one, this perspective is vulnerable to producing an understanding of the ageing process that emphasizes problems and shortcomings. This may contribute to a further scientization and biomedicalization of ageing or reinforce structural ageism in policymaking and institutions, as others have highlighted before (Östlund, 2004; Joyce and Mamo, 2006; Joyce and Loe, 2010; Calasanti, 2003; Moreira and Bond, 2008). Probably more important, however, this perspective neglects that the increasing deployment of scientific understandings and technological objects in the life of older persons alters the ideas about what it means to be or grow old — and that older persons are important agents in this rearticulation through their use of science and technology.

In this special issue, we interrogate this latter aspect. We demonstrate how the practices of ageing, science and technology are entangled in the design and use of technoscientific objects. This ongoing entanglement, we argue, transforms (and has transformed) the very idea of later life itself (see Vincent, 2006). The contributions in this special issue present empirical insights and develop conceptual tools to understand this transformation better by illuminating, in one way or the other, how technoscientific objects constrain or enable new practices and roles in the lives of older persons. Together, the contributions urge us to consider who acts, and is granted agency, in the design and use of science and technology; they highlight how techoscientific objects articulate definitions and role models for age and ageing; they explore how older persons are constrained by, but also re-articulate or defy such definitions and role models; and they illuminate what it means to grow old *with* science and technology as part of everyday culture.

Hence, this special issue addresses a pressing lacuna in the interdisciplinary study of ageing and gerontology. Indeed, gerontology has long demonstrated the social constitution of ageing (Baars, 1991; Dannefer and Daub, 2009), but it has sidelined the role of science and the design and use of technology as important arenas of this constitution (Neven, 2011; Joyce and Loe, 2010; McCreadie, 2010; Schwanen and Ziegler, 2011; Peine et al., 2014). Social and cultural gerontology have criticized the notion of ageing as a biomedical process, and have focused on the contextual factors that shape the practices and patterns of ageing, i.e., how the latter emerge and evolve at the intersection of institutions, role models, normative expectations and individual agency over the life course (Cain, 1964; Lawton and Nahemow, 1973; Riley, 1986; Kohli, 1986, 2007; Riley and Riley, 1994; Featherstone and Wernick, 1995; Katz, 2001; Cruikshank, 2003; Vincent, 2003; Dannefer and Settersten, 2010). Technology consumption has been shown to

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