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The Roles of Governance in Co-Evolutionary and Transformative Change - The Case of Active Ageing

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JEL codes: I15; O38

Keywords: co-evolution; multi-level perspective; governance; health care; active ageing

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THE ROLES OF GOVERNANCE IN CO-EVOLUTIONARY AND TRANSFORMATIVE CHANGE – THE CASE OF ACTIVE AGEING

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ABSTRACT

Addressing the need for a better understanding of how policy can target grand challenges, this paper applies a multi-level perspective (MLP) on socio-technical transitions onto current transformation processes in health care and active ageing. The objective of the paper is to improve our understanding of the roles and challenges for policy in this system shift, when perceived and conceptualized through the lens of an MLP perspective. In this way the paper seeks to a) contribute to an improved understanding of the co-evolutionary processes of transformative change in health care; and b) to examine the roles and tensions of governance and coordination of such processes in particular.

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INTRODUCTION

Throughout the last decade there has been growing attention within research and innovation towards how society meets and finds solutions to grand challenges (Omenn 2006; European Commission 2011; Head and Alford 2013). This requires a closer look at how the public sector engages in these processes and how it balances its different roles and policy measures. Through a case study of socio-technical transition onto active ageing, this paper seeks to contribute to improve our understanding of the roles played by the public sector.

One of the societal challenges that currently requires attention is demographic ageing (OECD 2009; United Nations 2013; WHO 2014). The expected demographic ageing in the decades to come will put increasing financial pressures on public welfare services through decreasing tax incomes and rising expenditures on social care. Against the background of these demographic prospects, it is no longer sufficient to merely increase productivity in the provision of existing public health services (OECD 2010; European Commission 2011). Instead, in order to ensure high quality welfare services in the future, there is a need for innovation and to re-think how health care services are organized and delivered. Addressing the challenges associated with demographic ageing, there are current attempts at creating new forms of health care provision. These initiatives seek to replace health care services based on centralized and institutionalized care with health care services based on distributed care by enabling people to live longer and more independently at home. In Norway a national program for welfare technologies was launched in 2013 seeking to lay the grounds for such a new health care system.

To analyze and discuss such a system shift this paper applies a multi-level perspective (MLP) on socio-technical transitions. The multi-level perspective sees systemic transitions as co-evolutionary processes that unfold through an interplay between three interrelated analytical levels; regimes, niches and landscapes (Rip and Kemp 1998; Geels 2002, 2004; Geels 2005; Geels and Schot 2007; Schot and Geels 2008). At this stage we shall only briefly state that a *regime* refers to the existing system of care provision, *niches* are seen as the locus for disruptive innovation pointing to radically new ways of providing care, and *landscapes* are understood as contextual factors conditioning regimes and niches.

It has been pointed out in the literature that there is a need for more analytical and empirical efforts in the study of governance of change in socio-technical systems (Borrás and Edler 2014). Moreover, much of the MLP literature has also tended to focus upon the emergence of new regimes, and less is

said about the decline of existing and old regimes (Turnheim and Geels 2013; Geels 2014). Consequently, this paper focuses on how the existing and the new regime are bridged, and what the roles of governance are in arranging for such a shift.

The objective of the paper is to improve our understanding of the roles and tensions of governance in this system shift in health care as well as its challenges and limitations. The paper discusses whether and how this socio-technical shift can be conceptualized as a regime shift, and what the roles of governance are in terms of developing innovative health services. In order to arrive at such an understanding, the study reflects on the roles played by different types of actors across the private and the public sector; how these are distributed across national, regional and municipal levels; and how the public sector manages to balance its roles as responsible governor of the existing regime on the one hand and as an experimental co-learner at niche level on the other.

The paper is structured as follows. Section two presents the conceptual framework applied, consisting of the multi-level perspective and theorizing on the roles of governance responses to grand challenges and transformational system failures. Section three accounts for the data collection and the method applied. Section four presents the case study. Here, some background and context for the case study is first provided, followed by an introduction of the policy program for active ageing in Norway. Based on an application of the analytical framework onto the case study, section five discusses the findings from the analysis. Finally, section six concludes.

GOVERNANCE RESPONSES TO GRAND CHALLENGES

Grand societal challenges are often perceived as complex and ill-defined, and require specialized knowledge and innovative solutions that can only be found through collaboration in broader constellations across public, private and voluntary sector (Rittel and Webber 1973). One of the key features of grand challenges is that they cannot be 'defined, assessed or solved by any single scientific or technological discipline or within one specific sectoral policy framework' (Leijten et al. 2012). Rather, grand challenges can be understood as 'open-ended missions, and missions concerning the socio-economic system as a whole, even inducing (or requiring) system transformation' (Kuhlmann and Rip 2014). As a response to this requirement, recent approaches to studying the role of the public sector and public policy in societal innovation and system change share a focus on how the public sector increasingly takes an active and integrated role in strategic collaboration with different societal stakeholders in addition to or even as a substitute for other forms of intervention, from regulation to

fiscal instruments (e.g. Rodrik 2004; Hartley 2005; Osborne 2006; Bason 2010; Mazzucato 2011; Sørensen and Torfing 2011; Flanagan, Uyarra, and Laranja 2011; Benneworth et al. 2014). In contrast to former governance paradigms such as traditional bureaucracy and new public management the public sector here tends to act as a learning partner in close interplay and coordination with various types of societal stakeholders to address and solve societal challenges. There is increasing recognition that the public sector often takes an active role in addressing societal challenges - in terms of supply side R&D support (Mazzucato 2011); through demand side and mission-oriented innovative public procurement policies (Edler and Georghiou 2007; Aschhoff and Sofka 2009; Edquist and Hommen 2000; Edquist and Zabala-Iturriagagoitiaa 2012), or through pre-commercial procurement (Edquist and Zabala-Iturriagagoitia 2014; European Commission 2006) which bridges supply-side and demand-side policy support.

Traditional supply-driven innovation policy measures such as R&D support have during the last decade become accompanied by a stronger attention towards 'responsible research and innovation' (European Commission 2011; Owen, Macnaghten, and Stilgoe 2012) and mission-oriented innovation policies (Edler and Georghiou 2007; European Commission 2012). Demand-driven innovation policies such as public procurement for innovation and pre-commercial procurement constitute examples of policy tools that are increasingly applied, and that may both serve as a catalyst for increasing innovation in the private sector, but nonetheless also stimulating innovation in the public sector and beyond.

The notion of 'policy mixes' refers to how the complexity of societal challenges requires an adequate balance of different policy measures (Flanagan, Uyarra, and Laranja 2011; Borrás and Edquist 2013). In the literature on policy mixes it is being emphasised how policy should be applied at multiple scales simultaneously and where the policy maker is seen as a learning agent who adjusts policy measures to the context in question and with a limited ability to direct the development (Laranja, Uyarra, and Flanagan 2008).

In line with such a collaborative and involved role for governance Rodrik (2004) has been discussing the need for policy to balance between an autonomous, independent role on the one hand, and an embedded role on the other. The independent state role reflects the need for accountability, democracy and impartiality, whereas the embedded role is seen as necessary when taking part in innovative learning processes. The embedded state role is understood as a discovery process focusing on the design of the policy *process* rather than policy *outcomes*. Here the public sector is expected to

take part in strategic collaboration with the private sector and together aiming to overcome the obstacles to reach common goals.

According to Borrás and Edler (2014) the most common ways to justify policy intervention is 1) to correct market failures, 2) to correct system failures, and 3) to achieve certain societal missions. *Market failure* legitimizes public intervention due to limited incentives for and short-terms returns from private investments in R&D. *System failures* legitimizes policy intervention to correct various forms of systemic deficiencies on the supply-side, demand-side or regarding the interplay of the two (Borrás and Edler 2014). *Transformation failure* legitimizes policy intervention to address societal challenges. Elaborating on such a transformation failure framework, Weber and Rohracher (2012) have delineated four possible types of policy failures in transformative change; (a) directionality failure, (b) demand articulation failure, (c) policy coordination failure and (d) reflexivity failure.

Directionality failure refers to a deficit in pointing innovation efforts and collective priorities in a certain direction to meet societal challenges. *Demand articulation failure* refers to a deficit in anticipating and learning about user needs, resulting in inappropriate and misleading specifications guiding development through e.g. procurement or policy programs. *Policy coordination failure* refers to a deficit in managing and synchronizing the inputs from different policy areas to meet societal challenges. Such coordination might include coherence between policies at international, national, regional and municipal levels (vertical coordination failure), or across different sectors (horizontal coordination failure). *Reflexivity failure* refers to a deficit in the learning feedback loops and in the ability to continuously monitor the progress of ongoing innovation processes and to adjust the course of action underway. Alongside the existing categories of market and system failures, such forms of transformational system failures will together constitute a more comprehensive framework and legitimacy for policy intervention and formulation.

A MULTI-LEVEL PERSPECTIVE ON SOCIO-TECHNICAL TRANSITIONS

Having been developed in studies of socio-technical transitions, the multi-level perspective (MLP) appears appropriate as one of the conceptual building blocks for analysing the current socio-technical transition actualized by demographic ageing and addressed by the policy program targeting active ageing and home-based care.

It is increasingly acknowledged how (societal) innovation is not just a matter of creating technical fixes or establishing the right institutions. Rather, transitions are required in the ways in which systems of provision and services are designed, organised and delivered. Such transitions encompass new technologies and infrastructures, but nonetheless also require corresponding shifts in markets, user practices, policies, institutions and culture (Geels 2002, 2005; Geels and Schot 2007; Geels 2014).

Hoogma et al. (2002, p. 19) define a socio-technical *regime* as: "the whole complex of scientific knowledge, engineering practices, production process technologies, product characteristics, skills and procedures, established user needs, institutions and infrastructures". The 'structuration' of this complex in terms of the internal alignment is high, providing stable rules and coordinating effects on the actors that are implied by the regime. As a consequence, regimes are hostile to disruptive innovation and radical change. Instead they are prone to lock-in and path-dependency and largely geared to generate incremental innovations and gradual change.

On the other hand, radical change is seen to take place in and emerge in *niches*. Such niches may be seen as 'incubation spaces' for radical new technologies. Niches can be seen as relatively immature variants or prototypes of potential future regime structures, that is, they still suffer from poor alignment among the different components (technologies, institutions, use practices). Niches often depend on protective conditions provided by specific user segments (market niches) or deliberate attempts of certain actors to support the new technology (technological niches) (Hoogma et al., 2002). Successful niche development thus depends on the availability of a nurturing environment, which allows for a socio-technical configuration to mature.

Both niches and regimes are situated within a socio-technical *landscape*, which constitutes a set of deeper structural trends. In this sense the landscape is the external context and structure for the interactions between different actors within (and beyond) the existing regime. Transitions, finally, are conceptualized as a shift from a historically predominant socio-technical regime to a new regime through the interplay of forces attributed to the different 'levels' of landscape, regimes and niches (hence the term 'multi-level perspective' – MLP).

The MLP perspective has been criticized for putting too much emphasis on the emergence of niches as the principal locus for regime change (Geels and Schot 2007). A key challenge is how successful innovations and practices developed in niches can be upscaled beyond these. Whereas earlier contributions of strategic niche management considered regime shifts to emerge through bottom-up

processes originating in niches, later theorizing understands innovations in niches in closer connection with developments at the regime and landscape levels (Schot and Geels 2008).

Analytical framework

Against this conceptual background the paper seeks to discuss the roles of governance in this particular socio-technical transition. The analysis interprets the roles and modes of governance at the various levels of niche, regime and landscape. Moreover, it focuses upon the development process of new welfare technologies across a) the driving forces for the transition (the initiative to niche developments), b) how the state engages in processes of learning and innovation (the accomplishment of niche pilots), and c) ensuring systematic learning, knowledge diffusion and feedback loops (whether it is relevant to speak of any forms of policy transformational failures). By applying this analytical framework onto the case of demographic ageing, the paper aims to a) contribute to an improved understanding of the current processes of transformative change of health care, b) to add to the literature on (management of) socio-technical transitions and c) to improve our understanding of how innovation policies, governance and coordination may help tackling the complexity of grand challenges (Coenen, Hansen, and Rekers 2015).

RESEARCH DESIGN & METHODOLOGY

Together the multi-level perspective as well as the notions of policy mix and transformational system failures seem to constitute an appropriate analytical framework for studying the roles of governance in the emergence of a pro-active healthcare system based on active ageing and welfare technologies. Reflecting the overall objectives of the paper, the research questions guiding the study can be formulated as follows:

- What are the roles of governance in the transition towards a new health care regime?
  - To what extent and how does the state possess conflicting roles?
  - To what extent and how is there reason to speak of policy transformation failures in this development process?

The data collection is based on data triangulation between a) desk-top and document studies, b) participation in policy and industry seminars, and c) interviews. The rationality for the study design is based on a qualitative and holistic approach in which various viewpoints and perspectives each

represent different pieces of a fuller picture and a more comprehensive understanding of the processes taking place.

The document studies primarily consist of collecting relevant material from government documents and policy reports. In addition a longitudinal media analysis of the news archive Retriever has looked into the media coverage of the terms ‘demographic ageing’, ‘welfare technologies’ and ‘home based care’ throughout the last decades.

In addition to the document analysis, participation at around 20 industry, policy and research gatherings (i.e. seminars, workshops, dialogue conferences, product presentations and conferences) in the period from 2011 to 2015 has provided a solid understanding of the policy landscape, debates and central actors in this field. The seminars targeted different audiences and spanned various themes from technological products and solutions, innovation, public procurement practices, market opportunities around welfare technologies, policy making and research.

Thirty interviews with relevant stakeholders have also been accomplished, primarily in 2014 and 2015. We conducted 15 of the interviews with representatives for the management of subcontractors of AAL solutions. These interviews were part of the research project “Trygghetspakken” which has been one of the ten pilot projects in the national program for welfare technology. The interviews with the subcontractors were on average 45 minutes long, and were conducted on telephone. The interviews with the subcontractors surrounded how the subcontractors view the possibilities and challenges in the market, their practices, needs and capacities. The respondents among the subcontractors were also asked about their experiences from their respective collaboration projects with the municipalities.

The remaining 15 interviews were conducted with key informants representing the policy apparatus, research and innovation policy programs, interest organizations and municipalities. These interviews were also following a semi-structured format, they were done face to face, and were on average one hour long. This bulk of interviews focused on the respondents views on the development process within ambient assisted living, including aspects such as coordination, collaboration, responsibilities, technologies, challenges, knowledge development and innovation.

A semi-structured approach was chosen to ensure touching upon wanted topics, whereas at the same time allowing for unexpected aspects to arise during the conversation. The selection of respondents is partly based on an understanding of the central players in this field stemming from the participation

in policy and industry seminars. Additionally, the selection of respondents in part also followed a snowball approach where interviewees were asked to name potentially relevant candidates for subsequent interviews.

THE CASE OF ACTIVE AGEING

The case study focuses on a national policy program addressing the societal challenge of demographic ageing through systematic exploration of the possibilities associated with welfare technologies in Norway. However, before introducing the program itself, some background will be presented.

Background

By 2050 it is expected that the population aged 60 years or over in developed countries will increase from 23 per cent to 32 per cent of the total population (United Nations 2013). The share of the population that is 65 years or older is rising in all OECD countries and is expected to continue doing so for many decades. In Norway projections predict that by 2050 the share of persons at 67 years and older will have risen from 13 percent in 2009 to 21 percent (SSB 2009).

The projected demographic ageing is a result of decreasing fertility rates and an increase in life expectancy, which can be ascribed to an improvement of public health, new medical treatments and improved diagnostic tools. Together these developments will strengthen the share of chronic and life-style diseases and increasingly replace acute diseases (OECD 2010, 2011).

The demographic changes expected cause pressures on public health services and capacity limitations, and actualize a shift from a re-active to a pro-active health care system (Teknologirådet 2009; NOU 2011:11; Meld. St. nr. 29 (2012-2013)). Whereas a re-active health care system is based on providing passive care and curing treatment, a system based on pro-active care is based on preventive and often home-based and patient-centric services enabling its users to manage their own lives as long as possible, often supported by welfare technologies.

The notion of ‘welfare technologies’ is broadly defined and comprises three groups of technologies: a) Technologies that increase safety and enable living at home longer (e.g. safety alarms, GPS trackers, fall sensors); b) Technologies that stimulate social participation and thereby counteract solitude (pictures and videos, video communication; and c) (Medical) Technologies that enable people to manage their own (chronic) health conditions (e.g. measuring blood pressure, blood sugar

etc.), and often in closer contact with family members and next-of-kin (NOU 2011:11). Moreover, all these technologies can be applied in mobile solutions, in (smart-)home-based solutions, and in terms of solutions in nursing homes.

(Table 1 in about here)

The emergence of new welfare technologies such as GPS tracking and sensors represents great possibilities for innovation in health care. However, today's welfare system still largely reflects an ideology and organizational design based on re-active and institutionalized care. In this system provision of universal and standardized health care services to a homogenous user population often stifles innovation through outdated processes and principles, e.g. through public procurement of off-the-shelf-solutions or by carrying out numerous and costly home visits to ensure that the user is fine. In the policy analysis targeting the potentials in welfare technologies it has been emphasized how there is expected to be positive effects from ensuring safety for elderly, which is assumed to enable and increase social contact, which in turn prevents cognitive deficiency. Such extended effects legitimize efforts at developing new solutions that enable elderly to live at home longer (NOU 2011:11).

Policy context

The analysis and knowledge base that constitutes the primary backdrop to the focus on active ageing and the potential of innovative welfare technologies is to be found in the official report 'Innovation in Care' launched 2011 (NOU 2011:11) and the white paper on Tomorrow's Health Care' (Meld. St. nr. 29 (2012-2013)). Here a national health innovation plan (Care plan 2020) is outlined aiming at developing new solutions and services within health care services. This long term plan contains a program for program for welfare technologies, a program for next of kin, and a program for professional re-alignment. Preceding these policy documents a report from the (Norwegian) Technology Council had also put welfare technologies on the agenda (Teknologirådet 2009).

Other important elements of the socio-political landscape surrounding the efforts targeting active ageing is the so-called 'Cooperation reform' (Samhandlingsreformen 2008-2009) which since 2012 transfers power and responsibility in health care provision from the state level to the municipalities and which also seeks to (pro-actively) prevent health care needs rather than to provide (re-active) care. Succeeding the Cooperation reform there is also an ongoing Municipality reform (Meld. St. 14 (2014-2015)) which seeks to ensure larger, more robust and more professional municipalities.

Moreover, official reports have also pointed at the potential for working more strategically and consciously with innovation in the public sector in general and with innovation in health services and in terms of innovative public procurement in particular (NOU 2008).

Parallel with the National Program for Welfare technologies other initiatives have also been introduced to support innovation in health care services and innovation in public procurement. Among these is an initiative by the Ministry of Trade and Fisheries who sponsors the National Program for Supplier Development[1]. The program is initiated and run by the Confederation of Norwegian Business (NHO) and the Organization of Local governments (KS). Another central initiative is InnoMed[2], which is a national competence network for need driven innovation in the health care sector established by the Norwegian Directorate of Health on behalf of the Ministry of Health and Care Services. Other national initiatives include the Program for Health- and Care Research initiated by the Norwegian Research Council and the coordinated efforts by the Regional Research Funds in targeting welfare technologies and elderly care.

In sum, these initiatives constitute important parts of the landscape for the current regime shift, and illustrate how the National Program for Welfare technologies has not arisen in a vacuum. Rather, the policy program may be regarded as one among several efforts to arrange for a pro-active and patient-centric health care system.

The National Program for Welfare Technologies

The data collection is structured around the National program for welfare technologies (Samveis)[3]. The program was launched in 2013 by the Norwegian Directorate of Health - an executive agency subordinate to the Norwegian Ministry of Health and Care Services. The overall aim of the program is to ensure that such technologies shall be an integrated part of public health care services by 2020. The main tasks for the program is to test and develop AAL (ambient assisted living) technologies and services in the municipalities, to generate and diffuse knowledge on AAL, to develop good models for the introduction and use of AAL technologies, as well as to develop standards and IT architecture

[1] National program for supplier development, http://www.leverandorutvikling.no/?lang=en_GB

[2] http://www.innomed.no/en/about-us/

[3]http://helsedirektoratet.no/helse-og-omsorgstjenester/omsorgstjenester/velferdsteknologi/nasjonalt-velferdsteknologiprogram-nvp/Sider/default.aspx

on AAL technologies. The national program for welfare technologies is primarily directed towards the municipal health care services, but will nonetheless also contribute to an increased use of AAL technologies in the specialized health services (national level) and in the private sphere.

The Government's attention has largely been directed at increasing productivity in the municipal health care service system through technology projects aimed at testing AAL technologies such as digital sensors, digital alarms, person tracking systems and safety systems. The Government has directed financial support and expertise to municipalities who wish to test such technologies in the patient's own homes, in specialized apartments, or to include AAL technologies when renovating or building new care facilities.

The national program for welfare technologies consists of four phases:

1. Establishment & preparations 2013-2014
2. Testing 2014-2016: The testing phase is to run until mid 2016 and its objective is to generate experiences and to develop methodologies and practical tools and service models as well as to facilitate training for the municipalities to implement solutions based on welfare technologies.
3. Upscaling 2015-2020: The program is planned upscaled to involve 320 municipalities by 2019. By 2020 80% of the population shall have access to health care services comprising welfare technologies as a natural part of the public health services.
4. Consolidation 2020: The objective for the consolidation phase is to ensure usage of the solutions based on welfare technologies by the end of the program period.

As part of the initial test phase the program has funded 10 pilot projects involving 31 municipalities (of a total of 428 municipalities nationally). These pilot projects primarily focus on digitizing, developing and upscaling safety alarms. The program in this sense aims to move from analogue, uni-functional and home based safety alarms to mobile, multi-functional and digital safety alarms allowing for increasing independence and self monitoring of own health. Such a shift involves creating a new architecture for data sharing as illustrated in figure 1 where local or regional service centres serve a range of users based on the digital monitoring and/or phone calls.

(Figure 1 in about here)

Since the launch in 2013 the pilot program has had a budget of approximately 3,5 million Euros annually. This should indeed be seen in conjunction with other parallel government funding of active ageing. 9 out of the 10 pilot projects test out various solutions associated with safety technologies (e.g. GPS tracking, alarm reception, fall detectors, motion detectors and smart house solutions such as electronic door locks). In addition a couple of the pilots test out medical technologies such as electronic medicine pill dispensers and logistics for effective home based services. The 10 pilot projects are being accomplished in different groups of municipalities ranging from 1 to 9 municipalities in each pilot project. Alongside the pilot projects a number of demonstration flats[4] have been set up in order to present and to make the new solutions facilitate accessible and understandable in real-world contexts.

All the municipalities that are included in the program are also part of a network to facilitate knowledge exchange, and which is coordinated and run by the Norwegian Directorate of Health and the Association of local and regional governments. Each of the group of municipalities in the program has selected respective research partners to be involved in practice-oriented research activities running along the project phases. Centre for Care Research at Gjøvik has been commissioned with the task of running a research network and to synthesize and communicate research results from the program.

In order to arrange for a market for new solutions based on welfare technologies, the Norwegian Directorate of Health has agreed to apply the international Continua framework. Continua is an international alliance consisting of a number of organizations and which points to various established international standards which will ensure interoperability and allow for diversity of solutions based on the same IT architecture. Continua will constitute a recommended standard from 2016 and will be considered made compulsory from 2019.

The program has also introduced several initiatives to stimulate municipalities and subcontractors to develop innovative solutions together, e.g. through the National Program for Supplier Development[5]. These activities seek to improve the knowledge about innovative municipal procurement and through

[4] Examples of these Are Fru Poulsen, Henie Onstad, Almas Hus / A-Hus Hospital, Innovatoriet, Buskerud and Vestfold University College.

[5] The National Program for Supplier Development is run by the Confederation of Norwegian Business (NHO) and the Organization of Local governments (KS).

establishing arenas for knowledge exchange between municipalities and subcontractors around services and solutions based on welfare technologies.

THE ROLE OF GOVERNANCE IN A REGIME SHIFT IN HEALTH CARE SERVICES

Addressing the research questions guiding the paper the following section discusses how the case study can be perceived when seen through the lens of the analytical framework applied.

A regime shift?

There are several factors that may legitimize referring to the ongoing changes in health care provision as a regime shift, or at least as an emerging regime. The goal is to move from centralized health care provision in nursing homes to an increasing share of distributed and patient-centric health care provision at home. Enabling elderly with multiple diagnoses to live longer at home at the same time implies a shift from re-active to pro-active health care service provision. In order to arrange for such a shift the national program for welfare technologies seeks to develop digital solutions such as safety technologies and digital monitoring devices that are either installed in the homes of the user or that are being held by the user. In terms of safety alarms, the technological shift consists of moving from analogue, uni-functional and (stationary) home based safety alarms to mobile, multi-functional and digital safety alarms. Nonetheless, the new digital alarms allow for an additional eco-system of health care 2.0 services and solutions and which represents a reconfiguration of the architecture of current health care services. Moreover, reflecting the goals of the policy program it appears from the interviews that there are signs of a mentality shift among municipal health care workers in terms of a move from passive (re-active) nursing and care to (pro-actively) arranging for enabling the elderly to lead independent lives through ‘everyday rehabilitation’. This represents differences in epistemic cultures associated with the existing and the new regime, and which may constitute a possible barrier to overcome in the upscaling and implementation of the new health care regime.

Finally, the planned changes to the architecture of health care services in terms of setting up a joint alarm central serving multiple users simultaneously may also strengthen interpreting this as a regime shift. Indeed, such an establishment of local or regional service centers serving multiple users living at home still represents an unresolved issue. Additional factors that have also been pointed out by the respondents as challenges towards the emergence of the new regime include instability in mobile

networks, legislation associated with data sharing, and public funding and portfolio of public health care services available.

(Figure 2 in about here)

Figure 2 presents the results from the longitudinal media analysis accomplished. The figure illustrates how there is a move towards an increased attention to welfare technologies and home based care signaling a rising public awareness towards how welfare technologies can address and help solve demographic ageing. At the same time it is clear that these tendencies have progressed at a low pace during the last three decades, confirming that changes in socio-technical regimes are slow, protracted and gradual processes. Still, the figure may be interpreted as representing the first stages of a regime shift, and which may condition the opportunity structures and the action space for governance.

Governance setting the agenda: The driving forces for the transition

When interpreted through the lens of the terminology from the multi-level perspective, the policy program for welfare technologies and active ageing can be seen as a result of (top-down) external landscape pressures. Such landscape pressures seem to have arisen externally through a combination of several factors such as the projected demographic ageing, an increasing share of chronic diseases, maturation and convergence of information technologies enabling self-monitoring of own health conditions, expectations for high quality public health care services and increasing pressures on public budgets. In sum, these factors have caused a need for innovation, and have created opportunities for government agency and initiatives to reform health care provision. Faced with expected demographic ageing in the decades to come and with the remaining landscape pressures, public committees were established and policy processes were launched from 2010 onwards, aiming to establish a knowledge base which eventually lead to the national program for welfare technologies.

Within these conditioning opportunity structures, the public sector has taken a lead role and pointed out the direction of this transformational change. The state has been pro-active in establishing the policy program (Samveis) itself; by initiating activities and networks to ensure interaction between municipalities and industry; by setting the agenda and pointing out the direction and long term goals that welfare technologies shall be an integrated part of public health care services by 2020; by defining the technologies and initiating the ten pilot projects within the framework of the national program; and not least by establishing a market and to ensure interoperability through providing technological standards in the Continua platform.

This demonstrates that a transition may very well need leadership (in this case by the state) that initiates and guides this process and confirms the critique that the governance of transition processes cannot be fully understood as a self-organizing process (Shove and Walker 2007).

To the degree that the state and the prevailing regime has set the goals for the new regime and initiated the policy grogram to reach this goal, the new niches can be seen as arising from or at least being supported by drivers within the existing regime. The policy program and the pilot projects in the policy program may in this sense be perceived as a catalyst for the emergence and upscaling of the new niches constituted by technologies enabling rehabilitation and distributed health care provision in terms of home based care.

Governance being involved: Interactive learning and innovation in the pilot phase

The experimentation with new solutions surrounding welfare technologies in the pilot projects can be seen as niche developments in the MLP terminology. As such, this policy program has provided resources and legitimacy, which in turn have carved out a protected incubation space that is partly shielded from competition and selection criteria in the mainstream care system. Importantly, it allows for collaboration and interaction with subcontractors, users and their next-of-kin that is conducive to increasing the alignment of emerging and immature technologies with values, norms and practices in care provision.

The data collection suggests that at a national level the various initiatives taken have had a top-down character led by the Norwegian Directorate of Health and the Association of local and regional authorities. This top-down approach and national coordination should partly be seen against the background of experiences from Denmark, where the "Welfare technology funds[6]" from 2008 was liquidated due to coordination challenges across a multitude of fragmented and smaller projects. Indeed, prior to the establishment of the national policy program many municipalities had already taken some initial steps towards testing out new technological solutions in small-scale pilot projects in advance of the national policy program.

[6] The ABT-funds (Applied Citizen-centric technology)

Despite this predominantly top-down-characteristic the public sector is in many ways heavily involved in the ongoing processes. The Norwegian Directorate of Health has arranged information meetings and seminars for learning and knowledge exchange between municipalities, subcontractors and other relevant stakeholders. This is not to say, however, that the state has lived up to the label of a so-called embedded state at all levels. The municipalities that have been part of the ten pilot projects have been expected to take an active role and part in their respective pilot projects in interplay with subcontractors on the one hand and with users on the other. Whereas it is in this sense arranged for an embedded governance role at the municipal level, the state level Norwegian Directorate of Health and its associated partner organizations (KS, NHO) maintain an arms length distance to the pilot projects and thus seem to take a more dirigiste role in terms of initiating innovative processes but still remaining somewhat independent outside these processes.

In a similar fashion, in the interviews with the subcontractors it was commonly stated that to learn about their own solutions they needed to be deeply involved in dialogue with municipal care professionals. Seeing the products in use (by patients and service providers) and hearing about the experiences and the wider implications of the technology on the social system surrounding the patient represented vital inputs to the developing firm. From both the health care service providers and the firms it was commented that making the technology work for every patient was demanding in the face of the multiple user situations and the variability of user capacities.

The AAL business actors depend on customer contact and dialogue with users in order to succeed with product and service innovations. A particular feature with this market is that the patient, the end user, the caregivers, and the patient's family are equally important in shaping the technology and the ways it relates to but also influences values, norms and practices in care provision. To learn about the interplay between technologies, values, norms and practices, firms need to engage in the dynamic interaction between these three user segments. This means that the municipal care services is the only arena for realistic testing of AAL technology.

According to the subcontractors interviewed, one of the greatest obstacles in the AAL market is the lack of knowledge and awareness of what AAL is and how it can be relevant to the municipal home care service. The firms experience a lack of willingness from the municipalities to acquire new technologies because of ignorance, lack of evidence of efficiency, and a lack of early technology adopters in the municipal sector. According to these firms, the professional health care community is prone to "stick to the old ways" and to be skeptical about getting involved with actors from the private

sector. Moreover, the professional community's notions about AAL mirrors the awareness and attitudes of the public in general. Thus, the Norwegian Directorate of Health, the Organization of Local Governments, and several trade organizations have done efforts to influence public opinion in general and the home care sector in particular towards greater willingness to acquire innovative products, and to take a more open attitude towards welfare technology. The market was perceived to be developing very slowly by the private companies, and to be susceptible to sudden plunges such as when the Norwegian Directorate of Health recommended that the municipalities should temporarily stop purchasing digital equipment until a common standard framework (Continua) was in place.

Related to the perception by the firms that the process has unfolded slowly, some of the pilot projects have been more oriented towards new technologies per se independent of their social and organizational application and implementation in municipal service contexts. There is indeed increasing understanding among the firms that the testing in the pilots should focus on organizational and institutional challenges and characteristics of services and not only targeting the technology itself. Such a perspective is supported by the Norwegian Directorate of Health, which is also increasingly putting stronger emphasis on standardization of services across municipalities.

After a period of market sag, ignorance and public skepticism there are reports of more activity in the market, more professionalism in procurement processes and more interest in innovations in this market segment. Still unresolved, however, is the challenges tied to mutual adaptation and innovation between the technological aspects and the provision of health services. Service innovation proficiency is in high demand in the sector as new technological equipment has created opportunities for new information processing, new ways to deliver services and new ways to involve patients, families, and social networks.

The interviews with the subcontractors illustrate how the municipalities become an important gatekeeper for learning and innovation between the subcontractors on the one hand and the users on the other. At the same time, the municipalities face the delicate challenge to balance between an embedded state role being engaged in the joint innovative development processes in the pilot projects on the one hand, and being the accountable, righteous and formal procurer of responsible solutions on the other. This may provide some of the explanation for why the municipalities were perceived as hesitant by the subcontractors.

Governance sharing the lessons learned: Transformational system failures

In many ways the national program for welfare technologies appears to have been professionally run and coordinated, at least when seen in relation to the somewhat limited resources allocated to the program. Still, when critically investigated through the lens of possible transformational policy failures, there seems to be reason to highlight certain types of challenges that the present case study has identified.

A main concern is associated with insufficient coordination across the multiple stakeholders and sectors involved in this exploration phase. According to the subcontractors, there is a lack of knowledge among the municipalities about existing solutions within welfare technologies and the implications and use of these. This view is also confirmed by respondents in the municipalities and illustrates that it is costly and demanding to be up to date with the developments in this field.

The finding that some of the pilot projects were initially directed towards the technological solutions themselves rather than towards their social implementation also suggest that the organization of this learning process could have been more thoroughly prepared in advance. Strengthening such an impression of a limited knowledge development strategy there was also complaints among the researchers following the pilot studies that there was no process of calibration of expectations across subcontractors, municipalities (and users) in the early phases of the pilot projects. Such a calibration process could have established trust across the involved stakeholders, in addition to clarifying roles, objectives and avoided false expectations and misunderstandings.

There also seems to have been limited coordination and synthesis a) across municipalities both within and beyond the national welfare program; b) across the practice-oriented pilot projects and other ongoing research activities under the direction of academia and the Norwegian Research Council (HelseOmsorg21 2014); c) across the research activities following the ten pilot projects and the Norwegian Directorate of Health and the Organization of Local Governments (KS); and d) across different relevant public sector stakeholders, such as the municipal health services and health care facilities at the Norwegian Labour and Welfare Administration.

The efforts of joint testing and knowledge generation in the pilot projects has so far primarily been practice-oriented and largely directed towards the municipalities. The assignment of the task of coordinating the research activities following the ten pilot projects to the Centre for Care research at Gjøvik was not done until Autumn 2014, and the first gathering in this research network took place

in April 2015, two years after the launch of the national program. This signals a somewhat limited effort and ambition in terms of knowledge synthesis and diffusion.

Whereas policy coordination has primarily been oriented upstream in terms of initiating the ten pilot projects, less has thus been done in terms of following up the experiences generated across the pilots at this stage, and nonetheless also in terms of including the different project partners into the learning feedback loop. Independent of the results and experiences generated in the pilot projects the Norwegian Directorate of Health is currently developing guidelines for various groups of municipalities regarding different needs and appropriate solutions. The coordination and upscaling of the experiences from the pilot projects beyond the niche level therefore seems to have been less developed.

Part of the explanation for the limited interest of the Directorate to take into account the experiences generated in the pilot projects relates to the number of test users included in the pilot studies, which so far has been low. This may partly be seen as a consequence of the current small-scale and first phase stage of the piloting, but it nonetheless requires an upscaling in order to provide better knowledge about user needs and functionality of the solutions being tested.

In sum, these aspects suggests a somewhat uncoordinated learning process in the National program for welfare technologies. In terms of knowledge development, these factors indicate a certain degree of reflexivity failure and policy coordination failure.

Related to the notion of a policy coordination failure is a planned transfer of responsibility for the national policy program from the Norwegian Directorate of Health to the county governor (decided by the Ministry of Health in December 2014). This has been a largely contested decision. The process is in this sense moving in the direction from a top-down approach towards a more distributed and regionalized process. On the one hand, a transfer of power from the central state level to the county level might be appropriate in terms of principally representing a larger ability to act as an embedded state engaging in joint learning and in closer connection with the involved stakeholders at a regional level.

On the other hand, such a distribution of power might also imply a weakened possibility to coordinate and upscale the experiences and insights generated in the pilot projects at niche level to the wider population of municipalities and other stakeholders. The institutionalization of new solutions of

active ageing into a new socio-technical regime requires power to affect and change existing societal institutions. A fragmentation of authority structures may represent a weakening of such an ability.

The skepticism towards the suitability of this transfer of power is also related to a concern that the county governor, who also keeps the municipalities under supervision (i.e. a control function), does not have the competencies nor the incentives to arrange for innovation and exploration at the municipal level.

CONCLUSIONS

This paper has sought to shed new light on the roles, possibilities and limitations for governance in the system shift from a re-active to a pro-active health care regime. The paper has documented how one may justify talking about a regime shift or at least an emerging new regime in health care services, and has reflected upon the roles of governance in such a regime shift. One might argue that the emergence of the new regime is taking place in terms of a (protected) niche development within the boundaries of the existing health care regime, and where the state has provided an important shielding function and is serving as a catalyst for developing and empowering the assisted living niche.

The study has applied a multi-level perspective in another way than what has been common in earlier studies. First, the MLP framework has often been applied in retrospective analyses of selected sociotechnical regimes. In contrast, the present study has targeted a transition process that is currently ongoing and unfolding, and where the outcome is still unknown. Second, and reflecting the above point, earlier studies using the multi-level perspective has methodologically been based on the use of secondary literature in historic analyses, whereas this study is largely based on primary data sources such as interviews. Third, the MLP perspective has primarily been associated with studies of sociotechnical transitions in transportation and energy (Shove and Walker 2007). Through the application of the MLP perspective onto the present case, the paper has found that this framework may also be suitable for understanding the role of management and governance in socio-technical transitions in public (health care) services.

The emergence of a new health care regime can both be seen as a result of external landscape pressures such as demographic changes, financial pressures and technological development, but also as a result of the niche activities in the pilot projects. The state has pro-actively defined the technologies, initiated the pilot projects, established networks and provided technological standards

for a market to emerge. The municipalities have engaged actively in the collaborative pilot projects. The case study has thus documented how innovation in active ageing constitutes an example of an entrepreneurial state (Mazzucato 2011) where the public sector has taken a pro-active role in arranging for and supporting the development of new solutions associated with assisted living technologies.

Moreover, the case study has illustrated how governance comprises a delicate balancing between embedded and dirigiste governance modes. Whereas the state has tended to operate in a dirigiste mode, the municipalities have primarily been operating in an embedded governance mode. Associated with this the study has found that there are contrasting roles and expectations associated with accountability (control, responsibility, risk-aversion) on the one hand, and with innovativeness (exploration, risk-taking) on the other. Interpreted through the lens of the MLP perspective the dirigiste governance mode corresponds to the responsible government of the existing regime both pointing out the way in terms of making sense of the external landscape factors, as well as initiating the niches and the move towards a new health care regime. On the other hand the embedded municipal actor represents the innovative niche level exploration. However, as has been pointed out, the municipalities also struggle with balancing between a dirigiste and embedded governance mode as they are both responsible for the provision of existing health care services as well as for the procurement of new and innovative services.

In this sense the paper has illuminated how a policy mix approach is applied onto the case of active ageing in terms of nuancing how the balancing between an embedded and dirigiste governance role may be played out in different ways; e.g. in terms of setting the agenda and pointing out the direction, involvement in innovative development processes, arriving at technical architecture and technological standards, and in terms of orchestrating the joint learning and coordinating the knowledge development process.

In terms of knowledge development it has been pointed out that there seems to be challenges in terms of coordinating and synthesizing the experiences generated in the pilots and ensuring learning feedback loops across the dirigiste and embedded governance modes identified. The paper has reflected upon these challenges in light of the policy transformation failures terminology (Weber and Rohracher 2012). This exercise has confirmed the relevance of this framework, and has helped interpret the challenges in the current case study. The study has pointed at a need for improved coordination across multiple stakeholders and a need for a continuous reflexivity in the overall

knowledge development. The paper has identified an insufficient (coordination of) feedback loops from and across the niche activities and which is likely to affect the pace of the transition process in terms of systematic knowledge management, development and diffusion. The contrasting rationalities between the dirigiste and embedded governance modes identified are likely to be part of the explanation for the policy transformation failures identified. Thus, in order to exploit the knowledge created and to facilitate standardization of services across municipalities, it appears necessary for the state to bridge its dirigiste mode with a more embedded mode in terms of accessing the systematic learning and knowledge feedback loops generated in the pilot projects.

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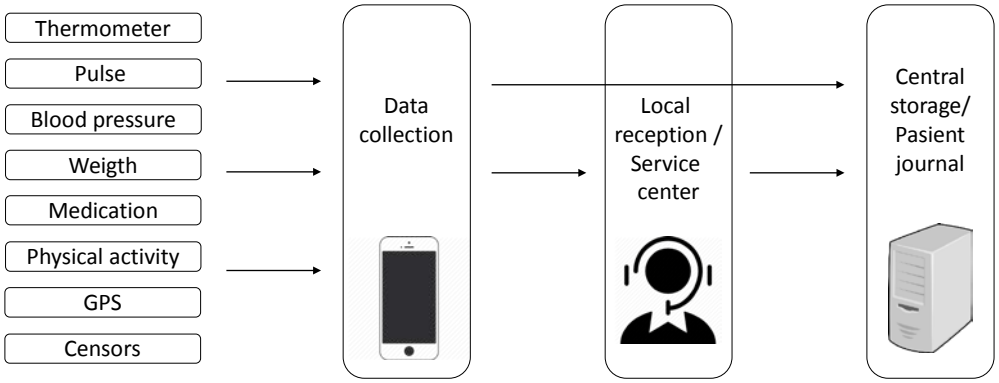
Table 1 Description of different elements of home based safety technology (SINTEF 2012)

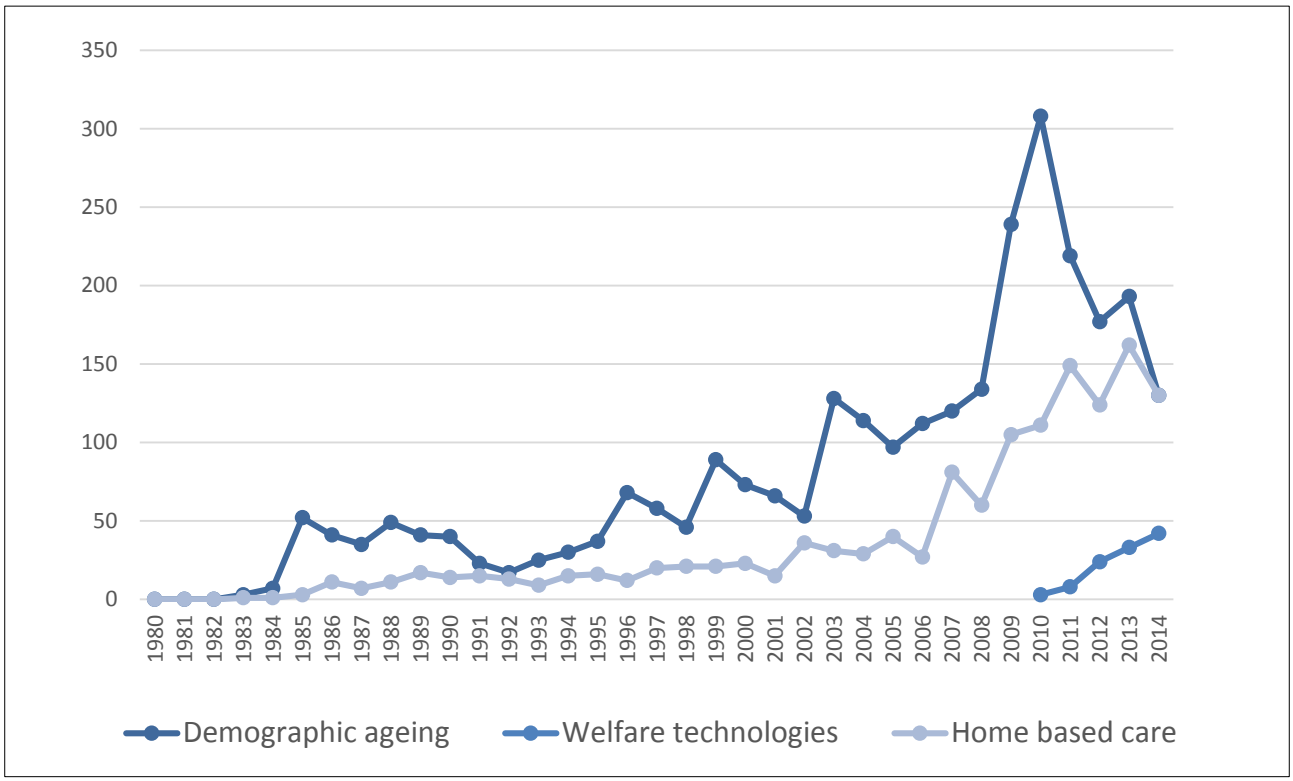
Main elements	Description
Teleguard	Sensor based solutions which automatically detects dangerous situations and report these to given persons or to an alarm central. Safety alarms where the user calls for help.
Ambient control	Automatic control of doors, windows, light and heating. The purpose is to facilitate living at home. E.g. camera showing who is outside, combined with remote control to open the door and automatic lighting when movement at night.
Self-mastery & support to kin	Solutions stimulating to social contact and a healthy and active life style.
Cognitive support	Solutions that support the user in overcoming the day-to-day activities despite cognitive deficiency. Examples include smart calendars reminding the users about day-to-day tasks and program and GPS providing safety when out of the home.
Tele-health	Continuous monitoring of the health condition of users living at home. Often a combination of monitoring done by the user (e.g. blood pressure) and regular follow-up via telephone or video. May have great effect for chronic patients and may be cost effective due to reduction in acute hospitalization.
Communication and interaction	A precondition for almost all solutions is a stable network and infrastructure for communication. Additionally interactive services such as video calls may give improved inspection and increase social contact.

Figure 1: User generated data from personal health technologies



Source: Based on The Norwegian Health Directorate

Figure 2: Annual number of articles in Norwegian media 1980-2014



The search terms 'Demographic ageing' (Eldrebølgen) and 'Welfare technologies' (Velferdsteknologi) both refer to the six largest national newspapers Aftenposten, VG, Dagbladet, Dagens Næringsliv, Dagsavisen and Klassekampen. The term 'Home based care' (Hjemmebasert omsorg) refers to all Norwegian media. Source: Retriever[7]

[7] Retriever is a Scandinavian digital news archive http://www.retriever-info.com/en/category/news-archive/