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# Design, Implementation and Use of Welfare Technology: Moving Healthcare Activities into Homes

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## Introduction

Population projections indicate a worldwide population ageing, with high-income countries leading the list (UN 2020). This poses a challenge for the delivery of healthcare services, both at a societal and economic dimension. In Norway, within the next 15 years, the population of children and young people will be overtaken by the elderly population. By 2060, the number of people over 70 years will have doubled. Particularly affected by this rapid ageing are rural areas within the municipalities of Norway (Syse et al. 2018).

The rise of life expectancy comes in hand with an increase in years lived with disability (YLDs) (OECD 2017). A shift in primary care, especially for delivering healthcare services for patients with chronic illnesses, is proposed to address this demographic change (Bodenheimer et al. 2002). Under the Scandinavian term Welfare Technology, a range of technologies and strategies are put in place to support the delivery of healthcare services and improve the life quality for its users.

## Welfare Technology

The term Welfare Technology (WT) originates from Denmark; in Norway, it was established in 2011. Welfare Technology is defined as technical assistance to increase safety and security, support inclusion and social well-being, support social participation, and support treatment and care for people with physical, psychological and social impairment (Helsedirektoratet 2012).

According to this definition by the Norwegian Directorate of Health, there is a wide variety of systems that would be classified as Welfare Technology. It is not always simple to draw the boundaries, and the definition of WT can be seen as ambiguous. Another way to approach this subject is to look at the context. A recently published book on WT defines three characteristics of WT: (i) WT takes place in the context of health, care, or welfare; (ii) WT allows to carry out services from a distance; and (iii) the target group is primarily the service recipient, i.e., patients and relative (Moser 2019).

## Background

The landscape of Welfare Technology (WT) consists of a wide range of technologies, such as various sensors, the Internet of Things (IoT) or GPS. Even though WT often introduces and relies on innovative technical solutions, challenges within this area are rather of organizational than of technical nature. Hence, the introduction of WT and in turn the digital transformation of healthcare raises challenges of sociotechnical nature (Helsedirektoratet 2012). This also affects the work of care providers and the communication and collaboration with their patients (Pine et al. 2018).

The recipients of WT are a heterogeneous group, with different requirements and conditions. Co-morbidities are no exception, patients often have to manage many diseases simultaneously. They might have to work with different specialists on their conditions and sharing their patient record and reports across different providers can be problematic. Switching perspective, the service provider needs to coordinate and diffuse the WT systems for its patients. They also need to work together with different WT and healthcare service providers, leading to fragmentation of services.

Platforms support the process of bringing together supply and demand, or in this case patients and WT services. A characteristic of platform architecture is its ability to scale. Patients can add (or will be prescribed to) different WT services, which are coordinated centrally by a platform owner (Farshchian et al. 2017). The ability to scale relies also on the underlying infrastructure. The platformization of healthcare services supports the integration of WT services in the workflow of healthcare providers. A platform may be defined in a computational, architectural, figurative, or political meaning. Tiwana is defining a platform as “a software-based product or service that serves as a foundation on which outside parties can build complementary products or services” (Tiwana 2013).

A platform architecture aims to break silos by supporting embeddedness across the ecosystem and provide capacity for the expanding set of WT services. Standardization allows to cover a large area of application, while supporting the highly heterogeneous group of actors by allowing local adoption and customization. Ideally, a platform would attract communities of external developers to add value to the platform (Monteiro et al. 2013).

## Research objectives

The aim of this PhD project is to investigate the design, implementation, and use of welfare technology and to unfold the implications of moving healthcare activities into the service user's home. This can be broken down into three research questions.

- (1) How is Welfare Technology disseminated to and tailored for its users?
- (2) How is moving healthcare work into patients' home affecting the work in healthcare?
- (3) What role play IT artifacts when healthcare activities move into the homes of the service users?

## Methodological approach

This interdisciplinary project is based on theories, concepts, and practices from the fields of Computer-Supported Cooperated Work (CSCW), Participatory Design (PD) and Information Systems (IS).

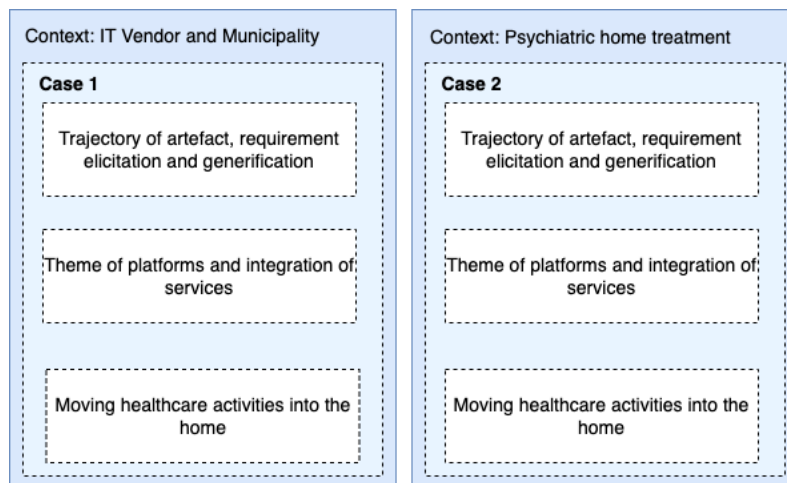


Figure 1. The PhD projects follows a multiple embedded case study design.

Methodologically, this research project is guided by a multiple, embedded case study design (Yin 2017). Data collection methods are mainly qualitative, depending on the case.

For case 1, I relied on semi-structured interviews, participant observations and documents. The site of study was a local company providing welfare technology and a large municipality. Case 2 followed an ethnographic approach, I conducted go-alongs (Kusenbach 2003) with two different mental health home treatment teams. The home treatment teams were situated in Berlin and Brandenburg, this allowed to see the difference between the work carried out in a city and a rural area.

The data analysis follows an interpretive approach following mainly the recommendations of Charmaz' grounded theory (Charmaz 2014). Data collection and analysis are carried out in an iterative way, allowing me to narrow down the analysis over time.

## Work to date

The PhD is following an article-based format; hence I will present the work to date by shortly discussing the papers published so far. Until now three papers have been published. The following publications may be included in the final dissertation.

The first article (Hochwarter et al. 2019) published focused on case 2 and presents empirical data collected during a summer school visit at a hospital in Germany. The hospital introduced the in-patient equivalent treatment for psychiatric care (home treatment) as one of the first sites in Germany. When receiving home treatment, the patients are treated as in-patient cases, but stay at their homes and receive daily visits from the home treatment teams. The home treatment patients commonly have a severe, chronic disorder, that needs a different degree of attention. Home treatment is usually carried out over four to six weeks, often during a crisis, and stops when the patient is ready to continue regular treatment again. This paper gives a first empirical overview of case 2 and possible themes are identified for further research.

In the next paper (Hochwarter and A. Farshchian 2020), we are exploring the theme of scaling participation with the help of findings from case 1. The WT supplier we base our analysis on, positioned itself as a platform for their users and the content providers (clinical questionnaires). The company covers a diverse user base and manages to support their requirements with their product. We discuss their strategy of managed communities, inspired by Pollock and Williams [18], and the nature of participation. I presented the paper at the Participatory Design Conference 2020.

A systematic literature (Hochwarter 2021), was carried out in the beginning of the PhD and identifies sociotechnical challenges of distance monitoring. I group the findings in the themes of social, motivational, legal, and cultural challenges. The discussion also includes the collaborative nature of these systems.

## Next steps

I have submitted a full paper to ECSCW, which is currently under review. The paper describes mental health home treatment (case 2), a service where patients with severe mental illnesses are visited by a multi-professional psychiatric care team at their homes. Based on ethnographic field work, we present three themes from the data analysis and coin the concept of Becoming a Guest, which is about the ambiguity of proximity and distance.

Having started the last year of this PhD, I currently work on a final paper to be included in the dissertation. The paper will be based on field work from case 1. The focus will be on platforms (Tiwana 2013) and what the concept of fluidity (de Laet and Mol 2000) can offer to the discussion of platforms. Further, I have started with the *Kappa*, which is the Norwegian term for the introductory chapter of the dissertation.

## Expected contributions

My research aims to contribute to a better understanding of the intersection of technology and healthcare. The contribution will be two-fold. On the one hand, I aim to theoretically contribute to the discussion of systems in healthcare by advancing the perspective of the interaction of users and artefacts in healthcare (Berg 1999; Latour 2005). On the other hand, my research aims to describe implications for the design of systems in a complex environment in motion.

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