Torbjørg Træland Meum (2023): ECSCW 2023 Exploratory Papers Instructions. In: Proceedings of the 21st European Conference on Computer-Supported Cooperative Work: The International Venue on Practice-centered Computing on the Design of Cooperation Technologies - Exploratory Papers, Reports of the European Society for Socially Embedded Technologies (ISSN 2510-2591), DOI: 10.18420/ecscw2023_n02

Scaling Digital Remote Care Technology: Installed Base Cultivation

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Abstract. Digital remote care is considered a solution to address the rising costs of healthcare by moving the treatment of patients to the homes, supporting a shift from episodic to continuous care, and promoting preventive care. However, it remains a challenge for user organizations (e.g., hospitals and health centers) to scale digital remote care to large patients' populations beyond small-scale pilot projects. Research has shown that the implementation and deployment of digital remote care requires the reorganization of resources, responsibility, competences in the organization, as well as the development of the existing infrastructures. These processes are therefore challenging, and the existing organizational, infrastructural, and digital capabilities of a user organization seem to play a critical role. Thus, in this paper, we address the research question of what is the role of existing socio-technical arrangement (installed base) in the scaling of remote care? We have addressed this question by conducting a case study in a primary care setting in Norway. This study contributes to increased insight into how existing socio-technological arrangements affect the configuration, adoption, and scaling of digital remote care for people with chronic illness.

Introduction

Digital solutions are considered key enabler to promote health, prevent diseases, and provide patient-centered care that meets citizens' needs (European Commision, 2018). International strategies have called for a paradigm shift in the way healthcare is organized (World Health Organization, 2015) and highlight the need for new models that enable patient-centered services and a shift from hospital-centered systems to more integrated care structures (European Commision, 2018). The increasing use of digital technologies has changed how and where care is delivered, i.e., remote care, telecare, telehealth (Bardhan et al., 2020). The terms telecare, telemedicine and telehealth are often used interchangeably; however, we use the term remote care which "involves the delivery of health and social care to individual within the wider community with the support of ICT enabled systems" (Barlow et al., 2012, p.225). Research in telehealth and remote care has increased considerably in recent years and several studies have shown how the use of digital technologies for patients with chronic diseases has provided clinical benefits as well as increased the patient's safety and self-awareness of their clinical condition (Morton et al., 2017). However, several studies have pointed out the challenges of implementing telehealth programs in daily practice (Varsi et al., 2019) and the need to theorize the distinct processes required to achieve widespread adoption (James et al., 2021).

Remote care technologies are collaborative tools that support the communication and coordination of patient and health professionals. Their use fundamentally changes the traditional interactions between patients and health professionals (Andersen et al., 2011; Bardram et al., 2005) and should be designed to support a variety of user needs (Woll & Bratteteig, 2019). They are also tools that transform the role of patients from care receivers to active data generators (Cerna et al., 2020) co-producing meaningful data (Miria Grisot et al., 2019). Most of the CSCW literature on remote care technologies has studied the design and use of these technologies on a small scale for specific group of patients and specific health conditions. We still have limited insights into how these technologies can be scaled and what the implications of scaling are for patients, health professionals, and their collaborative interactions.

Scaling of digital technologies has predominantly been conceived as a technical exercise following a linear trajectory from initial adoption to diffusion (Barlow et al., 2012). However, recent studies have also highlighted a practice approach to scaling (Barrett & Orlikowski, 2021) and scaling-up as a process of establishing the infrastructure needed to support widespread implementation of innovations (Greenhalgh & Papoutsi, 2019). Researchers in the CSCW domain have pointed to the need to conceptualize scaling as a bottom-up strategy and the socio-technical, transformative dimension of the scaling process (Rossitto et al., 2020).

In this study, we draw on the literature of information infrastructures and the evolutionary dynamics that characterize heterogeneous sociotechnical networks in which a wide range of activities are supported and shared by a larger community (Ciborra, 2001). Specifically, we work with infrastructures literature where scaling is conceptualized as a process of *installed base cultivation*. This means that scaling is shaped by the existing resources, technologies, practices, and organizational structures that are already in place (Aanestad et al., 2017; Hanseth & Lyytinen, 2010). Thus, understanding how the installed base shapes the scaling process is critical to conducting successful implementations beyond small-scale projects. In this paper we address the following research question: *what is the role of the installed base in scaling digital remote care?*

We have conducted research designed as a case study on the implementation and scaling of a digital remote care solution. The paper makes two contributions to CSCW research on the implementation of health information technologies. First, we offer a rich account from the perspective of user organization of the challenges of scaling. Second, we contribute to a conceptualization of scaling as an installed base cultivation. This paper is structured as follows. First, we position the study in relation to relevant literature on remote care technologies in the CSCW domain and present our conceptual lens of Information Infrastructure. Second, we present the research setting and method. Then, we discuss the preliminary findings from different viewpoints of the key stakeholders. Lastly, we conclude the paper with a summary and our future work.

Literature review

Research on remote care technologies in CSCW

Studies in CSCW have for a long time focused on the design of technologies to support remote care. For example, a literature review of CSCW research in healthcare illustrated how various applications and devices have been developed and deployed to support long-term interaction between patients living with chronic diseases and healthcare professionals (Fitzpatrick & Ellingsen, 2012). The use of remote care technologies has increasingly been used in elderly care and has changed the coordination of work in healthcare services. For example, Woll and Bratteteig (2019) argued that current technological solutions are not robust enough to support the various users' needs and proposed a comprehensive elderly care trajectory model. The increasing use of telecare solutions has also led to the establishment of central coordination hubs for remote care services. Farshchian et al. (2017) have studied a modern call center designed to provide services for the independent living seniors. One of the main findings of the study was "the tension between the episodic nature of existing call centers and the continuous nature of elderly care" (p. 335). Moreover, Personal Health Records (PHR) have also increasingly been used to enable person-centered healthcare services and patient-provider interaction. There are different types of PHRs; some are connected to institution-based systems, and some are not. However, a key feature is that it is under the control of the patient and thus transforms the information space between the patient and healthcare professionals (Vassilakopoulou et al., 2018). Vassilakopoulou et al. (2018) characterized PHRs as hybrid information spaces and investigated design tensions related to the hybrid nature of PHRs.

Several studies have shown how digital technologies for remote care have changed collaborative practice between patients and clinicians. For example, a study by Bardram et al. (2005) illustrated how home-based monitoring and treatment of hypertension transformed the patient-physician relationship. A similar study by Andersen et al. (2018) illustrated that patients and clinicians had different perspectives on illness and emphasized the importance of aligning the concerns of patients and clinicians in the design of person-centered digital services. The increasing use of remote care technologies has also illustrated the emerging need for data work in the healthcare which has been defined as "any human activity related to creating, collecting, managing, curating, analyzing, interpreting, and communicating data" (Bossen et al., 2019 p. 466). A study by Grisot et al. (2019) focused on novel nursing practice in the context of remote care and claimed that data work is crucial in remote care and plays an even more central role than in traditional care. Furthermore, they argued that data work is not only about analyzing the data element accumulated in the system but also includes the work of deciding what is relevant data and "guiding the patients into co-producing these data" (p.615). A similar study by Cerna et al. (2020) illustrated how digital technologies for patient-generated health data (PGHD) changed categorical work for chronic care and identified design implications to inform the design of collaborative systems. All in all, these studies have demonstrated how the use of digital remote care has reconfigured the practice, i.e., redistribution of roles and accountabilities, as well as a common information space for digital remote care. Furthermore, Mønsted et al. (2020) demonstrated how a system for preventive care was enacted through a pilot implementation. They further emphasized that pilot implementation has a generative role in infrastructure evolution and suggested that further research should elaborate on the mechanisms that facilitate infrastructure evolution. All in all, previous studies have provided a rich understanding of the situated practice of remote care and how it enables collaboration in local practice. However, less attention has been on large-scale implementation and how digital remote care has been scaled up to new areas and changing needs.

Scaling as Installed base cultivation

Our research engages with an understanding of scaling from Information Infrastructure studies. This body of research addresses issues of design, development, implementation, and scaling of large infrastructural technologies (Grisot, Hanseth, & Thorseng, (2014), and has shown that processes of managing IT innovation in the healthcare context, and the associated challenges and conditions for successful outcomes, are particularly challenging (Currie & Guah, 2006; Dickens et al., 2011; Greenhalgh et al., 2010; Hanseth et al., 2006). Information infrastructures are digital technologies with complex evolutionary dynamics (Ellingsen & Monteiro, 2003; Hanseth & Lyytinen, 2010; Ribes & Polk, 2014). A core dynamic in infrastructure evolution is scaling. Scaling is the process of extending the scope of digital systems by adding new users and/or functionality either in its current context of use or by incorporating it in other settings (Sahay & Walsham, 2006). Scaling is therefore about handling the problems and challenges associated with making changes [and] “to scale in response to new patterns of use and new services” (Monteiro, 1998 p.229).

Several studies have illustrated some of the challenges of changing large, complex systems and emphasized the crucial role of existing technologies, practices, and regulations (i.e., installed base) in the evolution of information infrastructures (Aanestad et al., 2017; Grisot et al., 2014). Hanseth and Lyytinen (2010) have defined an installed base as “consisting of a set of IT capabilities and their users, operation and design communities” (p.4). The scaling of digital technologies is thus influenced by existing sociotechnical arrangements and “inherits strengths and limitations” from the installed base (Star & Ruhleder, 1996). The seminal work by Star and Ruhleder (1996) has defined some key properties that characterize when a system becomes an information infrastructure. They emphasize how infrastructure is embedded into other structures, social arrangements, and technologies. Furthermore, they describe infrastructure as a fundamentally relational concept that occurs in relation to organized practices. *“An infrastructure occurs when the tension between local and global is resolved. That is, ... when local practice are afforded by large-scale technology, which can be used in a natural, ready–at–hand fashion”* (p. 114). Similar studies have also emphasized the interrelation aspect of information infrastructure and how the installed base both enables and constrains infrastructure evolution (Aanestad et al., 2017). The installed base provides some IT capabilities to expand the information infrastructure. At the same time, existing technologies and habits challenge this growth and entail negotiations and adaptations to cultivate the installed base to evolving needs. The notion of “cultivation” is used as a metaphor to illustrate the organic growth of the installed base as an iterative and incremental process (Aanestad et al., 2017; Ciborra, 1997). Several studies have provided insight into how the installed base affects the growth of e-health infrastructures (Aanestad et al., 2017) and will in this study be used as a conceptual tool to explore how it affects the scaling of digital remote care technologies.

Research Site and Methods

This study is part of a larger research project on the implementation, use, and scaling of digital technologies supporting high-quality remote patient care. The primary objective of the project is to investigate how digital technologies can be scaled, adapted, and evaluated to ensure high-quality remote care for patients with chronic illness or patients who need long-term follow-up from health professionals at hospitals or municipal home care services.

In this study, we have followed the implementation and scaling of digital remote care in a primary care setting in Norway. The municipality involved in this study has adopted digital remote care by participating in a national trial that lasted from 2018 to 2021. The target population for the trial has been patients with chronic diseases such as chronic obstructive pulmonary disease (COPD), diabetes, cardiovascular disease, as well as mental disorders and cancer. Based on the experience gained in the national trial, it has been decided to scale the digital solution to more users and user areas in health and care services.

The digital solution was initially developed by a Norwegian vendor to offer remote care for patients with chronic diseases. The digital solution is an integrated collaborative solution, based on health management cloud platform technology, and connected devices. The solution consists of a web-based patient portal and a patient application, as well as a set of integrated measuring devices. The patient portal for clinicians is developed for healthcare professionals to handle digital home follow-up, which integrates a range of patient-driven medical devices that support home-based care, such as medical measurements, symptom reporting and rehabilitation. The mobile application designed for the patients' end is used in combination with relevant measuring equipment, which automatically transmits the measurement results via Bluetooth to the patient's tablet or smartphone. The measurement results are immediately visible to the patient, and in the mobile application, patients can also answer clinical questions and register symptoms and side effects. The results are simultaneously transferred to a web-based patient portal so that health personnel can follow up on the values that come in and provide individual follow-up. The solution is integrated with several wearable measuring devices for patients to take measurements at home, for example, for blood pressure, blood sugar levels, weight, temperature, pulse, oxygen saturation, lung function and capacity, etc. The data are automatically recorded and transmitted via Bluetooth to the patient's end device. The scalability of the platform enables constant integration of new and appropriate measuring devices. The digital user interface also offers video conferencing and chat functionality that enables synchronous and asynchronous communication between patients and health professionals.

Research method

This study applies the interpretive approach to case study research (Walsham, 1995) and the aim of the research is to gain insight into how digital remote care is adopted and adapted to practice and what the installed base means for scaling across different contexts. Furthermore, this study is part of an ongoing multi-site, longitudinal project to follow the scaling of digital remote care through time and space. Specifically, we have followed the actors and factors involved in scaling digital remote care, how existing systems and habits affect scaling, and how scaling is enacted across different practices.

Data collection has been a combination of semi-structured interviews and the collection of archival documents. In the first phase of the study, we collected publicly available documents such as national strategies, reports, evaluations, and hearings. In addition, we have had access to some internal reports and evaluations. These documents have been used to gain insight into the historical development of digital remote care in Norway. To get a more in-depth understanding of the unfolding use of digital technologies, we carried out 14 interviews with key stakeholders in the project, i.e., health professionals, project managers and the supplier. The interviews focused on issues related to: How they perceive the use of digital remote care; how it affected practice; how it affected collaboration and coordination of tasks; and how challenges were handled. Most of the interviews were conducted in the local context in the municipality or at the hospital, but because of the pandemic, 4 interviews were conducted on Zoom. The interviews lasted approximately 45 – 60 minutes and was recorded and fully transcribed.

Analysis of data was inspired by a grounded theory approach and the area of enquiry guided the coding process (Charmaz, 2014). The initial step in the analysis was based on open coding to identify incidents related to adoption, use, and scaling. All the incidents/events identified in the empirical material were assigned a code and a descriptive label. When all the data had been examined, the initial codes were organized and reassembled in a new way. This process involved reflecting on activities and processes to make sense of how different stakeholders perceived the use of digital remote care. The analysis was an iterative process moving back and forth between the initial codes to compare incidents and the relationship between the codes. At this stage in the analysis, more focused coding was used to conceptualize larger segments of data. The theoretical framework on scaling information infrastructures was used as an analytical lens to identify some theoretical themes that provided a more comprehensive understanding of how digital remote care was enacted in practice.

NVivo software package (version 12) was used throughout the analysis to code, organize and visualize data.

Findings

Preparation and configuration of digital remote care

National strategies in Norway have pointed to the need for better coordination between specialist and primary care as well as the need for more patient-centered health services. Digitalization is regarded as a measure to achieve these goals and national initiatives have been implemented in recent decades. A national program for welfare technology was implemented during 2014– 2018, which involved the introduction of digital alarms, medication dispenser systems and localization technologies in the municipalities. This program has been continued during 2018–2021 as a national trial for the use of digital remote care which included six projects in different municipalities in Norway. The target group for the trial was chronically ill patients with a medium to high risk of deterioration of their condition and increased need for health and care services. The main objective of the trial was to gain knowledge and experience with the use of digital remote care as well as recommendations for further implementation and scaling.

The management of the national trial was handled by the Norwegian Directorate of Health, which provided financial support as well as support to organize local workshops and meetings. For example, workshops were organized with key stakeholders in the local projects, i.e., nurses, GPs, and vendors. Service designers were also involved in the trial to facilitate methods and tools in the design of new patient pathways. Service designers provided tools to define specific objectives, map the existing service, and difficulties in existing practice as well as proposed solutions for follow-up of patients. Stakeholders in the local projects invested time and effort in the development of new patient pathways that formed the basis for the design of the new digital solutions.

Different models for the follow-up of patients were used during the national trial. However, most of the local projects decided to establish local/regional follow-up centers to make the best use of the professional resources. Staff at the follow-up center played a key role in the follow-up of patients during the trial and include training, guidance, and daily follow-up of the patient's self-monitoring. The main components for self-monitoring that became available in the digital solution during the trial were measuring devices for vital signs, questionnaires for reporting symptoms and a self-care plan which is a plan of patients' goals and measures to follow up on their own health.

Cultivating and extending practice

The municipality included in this study has gradually adopted digital solutions in health and care services and has since 2014 participated in national initiatives for the use of digital remote care. Participation in these projects has enabled an incremental development of digital remote care in line with emerging needs. Health professionals in the municipality have experienced the usefulness of the digital solution as stated by a project manager in the municipality: "*Many of the solutions in the App have been developed in collaboration with the municipality and those who work at the follow-up center, and that is part of the reason why we think that the solution works so well for us now*".

The municipality provides health and care services to a large population, and several follow-up centers have been established that play a key role in the digital follow-up. Firstly, employees at the follow-up center are involved in the enrolment of patients who may benefit from digital follow-up. Patients can either be referred internally from the home care services in the municipality, by their GP or from the hospital. The referral to digital remote care follows existing routines for interaction between different levels of the health service. For instance, referrals from the hospital are sent as an electronic message to the case manager in the municipality who forwards it to the follow-up center. After the patient has been enrolled, a 14-day trial period begins. The trial period usually takes place as follows: The nurse at the follow-up center makes a home visit to get to know the patient, delivers equipment and provides training in the use of the digital solution. Based on experience during this period, an agreement is made for further follow-up in an interdisciplinary meeting between healthcare personnel and patients.

The local follow-up center is open Monday through Friday from 8 a.m. to 4 p.m. and is located close to the homecare service in the municipality. The daily follow-up is performed by nurses and involves professional assessments of self-reported data from the patient. An overview of patient-reported data is available in the user interface to both patients and healthcare professionals. In addition, the results have a color code (red, yellow, green) and if the measurement is above or below the threshold value set by the doctor, the result has a red code. This makes patients more aware of their own clinical condition while healthcare professionals have access to patient-reported data to make clinical assessments. The digital follow-up of patients involves professional knowledge and skills as stated by a project manager in the municipality: *"They say that they use more of their nursing skills (...) many professional assessments on how to react. They need to assess alerts, messages that the patient has sent, and answers to questionnaires, and be able to put them together and give a good assessment of how to follow up on the patient further. I think those who work there think it is very good to be able to use their assessment skills".*

Clinical judgement is an essential part of nursing, and the display of patient-generated data provided a good overview of the clinical condition over time as a support in the clinical decision-making process. The nurses also use clinical data stored in the EPR (medication list, test results etc.) if they need more information about the clinical situation. They also have the opportunity to make a video call with the patient to clarify the situation.

As briefly outlined above, the use of patient-generated data has become a useful resource in the follow-up of patients and evolved to become part of everyday practice. Although the use of structured questionnaires and self-treatment plans have not been part of existing practice in home care services, these have become an "extending hand" in the digital follow-up.

The usefulness of the digital solution has led to scaling to new patient groups such as follow-up of the patient with cancer. In this case, cancer nurses were involved in the follow-up of the patients, which required interdisciplinary collaboration as explained by a project manager. *"Then we had to create new pathways for this group because they had to be followed up by other resources and a completely different arrangement (...) so we had to reorganize a bit to meet the needs of the user group and the employees who followed them up. And then there was also much closer involvement of the GPs and there was close involvement of local hospitals in the recruitment phase".* In addition, the digital solution was adapted to the follow-up of COVID-19 patients during the pandemic and an infection control team in the municipality was responsible for the daily follow-up. The adaptability of the digital solution shows that digital remote care can be useful in different contexts and there are now ongoing activities to scale the digital solution in the municipality.

Negotiating cross-boundary coordination

The initial usefulness of digital remote care has gradually been adopted by a large user community in the municipality. However, the scaling of the digital solution is still at an early stage and some key issues have been identified that need to be addressed in the further process. On the one hand, digital remote care has led to increased interaction between the municipality, GPs, and the hospital. The GPs have an important role in the follow-up of patients by approving and revising the self-treatment plan used by staff at the follow-up center. For example, electronic messages are used if the nurse needs medical advice from the GP or needs to make changes to the self-treatment plan. The use of the self-treatment plan has thus facilitated coordination between health professionals and the patients, and the nurse at the follow-up center has become a link between the GP and the patient. However, interaction across professional and organizational boundaries remains a challenge. For example, some GPs and hospital doctors are concerned that digital follow-up may lead to additional work as illustrated in a statement from a project member in the municipality: *"It has been quite challenging to establish a good interaction with the GPs and there are several reasons for this.*

The GP is overloaded with work, and they do not always see the benefit of using digital home follow-up."

Another issue that has been discussed is the need for integration between various digital solutions used in the healthcare service. Firstly, there is a lack of integration between the digital solution for remote care and the EPR used in the municipality. This leads to additional work and manual procedures to share information among health professionals working in the municipality. Secondly, there is a lack of integration between the digital solution for remote care with the EPR systems used at the hospital and by the GPs, which challenges the overall follow-up of the patients. Traditionally, electronic messages are used to exchange information between municipalities, hospitals, and GPs. However, this entails additional work and there is a need for integrated solutions to facilitate interaction between different actors in the health service. To resolve this issue, activities have been initiated to develop standardized interfaces to transfer data between the digital solution for remote care and EPR systems use in the municipality, at the hospital and by GPs. Furthermore, activities have been initiated to sort out what information is useful to whom and in what situations. Some doctors are concerned that access to self-generated data from the digital solution may lead to information overload as shown in a statement from a project member in the municipality: *They also have a policy that they never want more data than they need, so if they are going to get information, it must be proven that the information is of use to them".* A similar statement from the Norwegian Medical Association illustrates this issue: *"Importing large amounts of data of limited relevance could lead to data overload and could create additional work and risk. What is clinically useful and relevant may be lost in the amount of irrelevant and noisy data".* The first step in solving this issue was to map the need for sharing information among various stakeholders. The goal is to develop an integrated solution that is adapted to different roles, tasks, and responsibilities.

Discussion

In this study, we have illustrated how digital remote care has been adopted and further scaled by adding new users and functionalities across organizational units. The findings illustrate a successful bottom-up strategy that evolved gradually from existing practice. However, the findings also show how issues emerged and challenged further scaling across professional and organizational boundaries. We argue that the installed base played an important role and will further elaborate on the cultivation of the installed base and how it affected the scaling of digital remote care.

Firstly, the design and development of digital follow-up was based on the existing installed base, i.e., the organizational, institutional, regulatory, and sociotechnical arrangements that are already in place (Aanestad et al., 2017). For example, the first phase of the local project in the municipality was based on existing practice to define the goals of the digital follow-up of patients and formed the basis for the development of patient pathways. Professional knowledge and experience in follow-up of patients with chronic diseases also formed the basis for the development of functionalities in the digital solution. Digital capabilities enabled a more patient-centered follow-up and functionalities for self-management were gradually developed in close collaboration between health professionals, service designers and the provider. This process illustrates how the installed base can be a resource for creative design and enable the growth of information infrastructures (Aanestad et al., 2017; Hanseth & Lyytinen, 2010).

Secondly, the cultivation of the installed base implies an iterative and incremental adaptation over time (Aanestad et al., 2017; M. Grisot et al., 2014; Hanseth & Lyytinen, 2010). Implementation and scaling of digital remote care have been going on for a long time with a gradual adaptation and expansion of the service. They started with the small-scale implementation that provided direct usefulness and motivated further scaling. In the first phase, they also selected a limited group of patients who could benefit from a patient-centered follow-up. This strategy has been quite successful and both patients and healthcare professionals are quite satisfied with the solution and motivated to further scaling. User mobilization is an important part of the cultivation process and previous research has highlighted strategies that provide immediate benefit and motivate users and then generate positive network effects; that is, the IT capability derives its value from the size of its user base (Hanseth & Lyytinen, 2010 p.13). This strategy of user mobilization promotes the growth of the installed base and creates momentum for further adoption (Grisot et al., 2014). As illustrated above, the potential usefulness has gradually motivated users who have gradually expanded their use of the digital solution in the municipality. However, several constraining mechanisms of the installed base were also revealed during the implementation process. For example, it is still a challenge to share information across professional and organizational boundaries. The adoption of digital remote care was supposed to improve interaction among all actors involved in the digital follow-up of patients. However, existing infrastructure challenges information sharing between the municipality, hospital, and GPs. For example, it was difficult to mobilize the physicians because they did not see the immediate usefulness of digital remote care. This issue illustrates the bootstrapping problem (Mønsted et al., 2020) and has slowed down the scaling to new user groups.

Another challenge was the lack of integration between the digital remote care solution and EPRs. The use of electronic messages has been a well-established solution in health care and was also used to share information between nurses and GPs. However, it was not sufficient when the nurse had to copy data from the digital remote care solution into an electronic message. According to Cabitza et al (2019), duplication of data in different systems may lead to inconsistencies and additional work in aligning different sources of information (Cabitza et al., 2019). Consequently, there are ongoing activities to integrate various systems and to agree upon some rules for exchanging information between the digital remote care solution and EPR systems. This involves sociotechnical negotiation to balance the need for standardization and local customization (Monteiro, 1998; Sahay & Walsham, 2006).

Conclusion and further research

In this study, we have addressed the role of the installed base in the scaling of digital remote care in primary healthcare in Norway. Firstly, we have illustrated how existing socio-technical arrangements influenced the configuration of digital remote care. Second, we argue that the cultivation of the installed base involves an iterative and incremental adoption over time. Third, we have illustrated how cross-boundary negotiations enabled further growth of the installed base.

Scaling of digital care in Norway is still at an early stage, and further research will focus on how scaling is adapted to other contexts in the health service. For example, we have conducted data collection at a hospital that is in the process of scaling digital remote care for outpatient clinics and home hospitals for children. Furthermore, we will focus on the interaction between hospitals and municipalities, which will provide new knowledge about integrated health services across organizational units.

Acknowledgments

The Digi Remote project (No. 310137) has received funding from an IKTPLUSS-IKT and digital innovation grant from the Research Council of Norway.

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