

The Complexity of Governing a Regional EPR System

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Abstract. This paper focus on the complexity of governing a regional EPR system. This is done directing the following research question: what is the role of the regional archetype governance organization, and how does it relate to the other actors in the ongoing infrastructuring process of establishing a regional EPR system? The paper builds on infrastructuring and boundary work theory. Empirically it follows the work of governing a new openEHR based EPR system, and the governance structures connected to the system. Some important issues are the interrelation between the governance organizations, the boundaries between them, and if the archetype governance organization can work as a bridge builder between technical and clinical governance.

Introduction

An emerging concern in Western healthcare is to establish Electronic Patient Record systems (EPR) able to collaborate on serving several hospitals, like in a health region, to enable managing and streamlining complete patient pathways and semantic interoperability, as well as monitoring and comparing the hospitals. However, implementing a regional EPR is not done over night. Involved hospitals typically have implemented different technologies diverging routines and policies, depending on the size of the hospital. It is therefore important to include the interconnection between technology and organization in this socio technical process.

One possible solution is to implement a openEHR based EPR system with archetypes as the storage for clinical information. Archetypes are clinical standars formed by clinicians to ensure structuring and reuse of data (Chen et al. 2009). However implementing such large scale EPR system requires a well functioning governance organization to work sufficiently across an health region. Hence the North Norwegian Health Authority decided to establish an regional archetype governance organization. The health region was an II including two regional (technical and clinical) governance organizations as well as four (one for each health trust) local governance organizations. This was a complex and fragmented governance structure for governing parts of the same EPR system. Some important issues to define were the power balance between the different actors governing the same system, and how to define the responsibility areas among them as well as the boundaries between them. One challenge with fragmenting the EPR

governance is the lack of total overview and an increased need for boundary spanners to define the boundaries and ensure collaboration between different actors (Gieryn, 1983). McGinnis (1999) states that it has been impossible to agree on such fragmented governance models in the past were several heterogeneous interests and resources are involved in the same large scale II. Therefore an important question is whether adding an extra actor to this fragmented regional governance only contributes to complicating the governance structure, or if it is possible for the archetype governance organizations to gain an interconnecting role between the existing governance organizations in the infrastructuring process of establishing a regional EPR system. Therefore the research question is as following: what is the role of the regional archetype governance organization, and how does it relate to the other actors in the ongoing infrastructuring process of establishing a regional EPR system?

The paper builds on theory in relation to infrastructuring and boundary work. Empirically it follows the work of governing a new openEHR based EPR system, and the governance structures connected to the system.

Theory

ICT governance is widely believed to lead to more effective use of ICT systems in organizations and it addresses how to design and implement effective organizations through flexible information systems (IS) and processes (Patel, 2002).

Information infrastructure (II) is a framework fit to describe the interplay between the different actors connected to an EPR system like in this case different governance organizations, set to govern parts of the same EPR system. II is a way to study the design, implementation, and use of large-scale information systems (Aanestad and Jensen, 2011; Star and Ruhleder 1996). The infrastructuring process of establishing an II is defined by Karasti and Baker (2004), as a ongoing process highlighting a complex interrelation between e.g. co-construction, participants collaborations, information systems, and infrastructures.

Having a fragmented governance of the regional EPR provides an increased need to define the boundaries and ensure collaboration between different actors (Gieryn, 1983). Boundary work is required to distinguish the responsibility areas of the different governance units (Ibid.). The boundaries are not permanent and frequently negotiation will be necessary. Boundary work is used to define niches including goals, methods, capabilities and functional expertise to separate the responsibility of the actors in the fragmented governance organization (Ibid.).

Method

This study is positioned within a qualitative interpretive paradigm. The focus is on evolving and improving the understanding of a studied phenomenon, by looking at it from different viewpoints, within a context (Klein and Myers, 1999; Walsham, 1995). The fieldwork draws on observations and participation both in the regional and national archetypes work in Norway. This includes 27 open-ended interviews with archetype reviewers and members of NRUA, including themes like why they chose to participate as reviewers, challenges with participating in this work and how the work is organized.

Table I. Details of the data collection.

	Number of persons	Duration	Period
Interviews			
Archetype reviewers	12	30-90 min	2014-2016
NRUA members	5	60-90 min	2014-2015
Persons involved in the EPR development	7	60-120 min	2013-2015
Observations			
NRUA/regional resource group		200 hours	2014-2016
Development of EPR system		80 hours	2012-2016
Archetype review and CKM use		5 hours	2014-2015
Discussions		100 hours	2012-2016
Document studies			
		240 hours	2015-2016

The purpose of using open-ended interviews is enabling informants to tell their story, without the author's pre-perceptions getting in the way. The interviews were transcribed and analyzed both separately, and as a part of a whole (Walsham, 1995). In addition, information about the reviewers and the nationally approved archetypes documents from the CKM were important parts of the data collection, also observations from several workshops and meetings were included.

Case

This case focus is on the complexity of governing a regional EPR system and how the existing governance II is extended by adding an additional governance organization.

The Infrastructuring Process of Regionalizing the EPR System

In the North Norwegian health authority an infrastructuring process of regionalizing the ICT portfolio has been going on since 2011. Responsible for this process was the regionalization project (Felles innføring kliniske systemer - FIKS). The primary goals were to collaborate closely with system users, vendors and governance organizations on creating a foundation for regionally standardized patient pathways, decision support and interaction between clinical ICT systems.

An important part of the regionalization process was the ongoing development of a new openEHR based EPR system, collaborating closely with the system vendor. The new EPR was built on an openEHR architecture, with a goal to ensure interoperability and design flexibility for the users. The openEHR architecture consisted of a two-level modelling approach for EPRs separating technical design of the system from clinical concerns. This made it possible for clinicians to be in charge of defining the clinical content of the EPR system, the archetype standards. Archetypes are structured data elements of clinical concepts, envisioned to ensure technology-independent interoperability, easy reuse of information and efficient decision support (Chen et al. 2009).

The Existing EPR Governance Organizations

The existing technical regional governance organization including about 200 person had since 2005 been responsible for supporting and managing all technical and some clinical issues of the existing EPR system. In the new EPR system they would be in charge of governing mainly the technical part of the new two-layered openEHR. This demands for defining the boundaries

towards the clinical EPR governance. It was not an alternative to merge the clinical and technical EPR governance in this organization even if it was a regional organization with both technical and clinical competence. “The distance between the clinics and the regional technical governance organization is too long. It takes too much time to solve a problem” (project leader). The director of the regional technical governance also said that they mainly wanted to focus on technical issues of the new regional EPR system in the future.

When the health region decided to regionalize their ICT portfolio included the EPR system in 2011 they started working on establishing a regional clinical governance organization. However it was very challenging to negotiate the nature, form, and location, of this organization. Several models were suggested and discussed, but the region was not able to decide on a final solution. “To carry on the regional work it is necessary to have a solid regional governance in place. If not all regional structure falls apart after the regionalization process finishes” (Project leader). One reason for this was that all health trusts had local clinical governance of their EPR. The bigger the health trust, the larger local governance organization. At the The University Hospital North Norway (UNN) the local governance organization had about 20 multidisciplinary experienced system users from hospitals. It took five years to find an agreement on how to organize the clinical governance in the health region. In 2016 a regional clinical governance organization was established, this was located at UNN with employees from all over the health region. They focused on all types of clinical issues in relation to running the EPR system.

The Role of the Archetype Governance Organization

For the new EPR system it was necessary to establish archetype standards for defining the clinical content. This was a collaboration between a nationally established governance group described by Ulriksen et al (2017) and the health regions. This was a large task going on for years, including several hundred clinicians across Norway. These standards were the main building blocks of the new EPR system, and it was therefore decided to establish a separate archetype governance group in the health region as a part of the clinical governance. It was very important to define the boundaries between the different governance organizations to establish a best possible total governance of a large scale II like the regional EPR system. The new EPR system and the two level model the openEHR architecture built on, generated a need for establishing a regional archetype governance, for this infrastructuring process to succeed. To illustrate the importance of this one of the members of the regionalization project described that early attempts to pilot parts of new EPR system had stopped due to the lack of a sufficient governance organization.

This organization had a secretary of three persons in with representatives three of the four health trusts in the region. The archetype governance group assist regional projects in archetype related matters and they are working with identifying all the regional and local archetype initiatives. They also worked in close collaboration with the national archetype governance contributing to establishing national archetype standards for the EPR system. Hence they are a link between the regional and the national archetype work described for instance by Ulriksen et al., as well as between clinical and technological governance of the new EPR system. There is a identified gap between the technical and clinical aspects of the EPR system, hence there is a need for intervening the clinical and technical resources to coordinate pure clinical knowledge and pure technical competence to form a total overview of the new EPR system. This is a new way of establishing an information infrastructure within healthcare to organizing ICT governance at a regional level and to establish a close collaboration between the clinical and the technical ICT governance organizations, linking system developers and healthcare personnel. This enables the organizationally challenging work with clinical standardization. The health

region currently don't have healthcare personnel with formal competence to coordinate these socio-technical processes and the role has to be defined and evaluated over time in an extensive infrastructuring process.

Concluding discussion

The success of developing and implementing an EPR system will always be influenced by the information infrastructure it is implemented into. Establishing a regional EPR system demanded for more clinical governance at a regional level. The openEHR architecture build on a two level model (Chen et al. 2009), claiming the possibility of separating technical and clinical issues, enabling also separating the governance of such issues. However as described by for instance Ulriksen et al. (2017) there is a close interrelation between the new EPR system and the clinical content of the system (Archetypes). It is not possible to finish the archetype standards without having a system to try them out in, to see how they work in clinical practice. Also, it is impossible to complete the functionality for the new EPR, without having the archetype standards for the clinical content. Hence having several organizations governing the same EPR system is very complex, requiring constant collaboration and negotiation. There are several borders between the different actors within such infrastructure that has to be clearly defined to avoid boundary disputes (Gieryn, 1983). Also, there are no one responsible for a total overview of the systems, and it is unclear how to solve disputes if some of the governance organizations disagree on how to handle a particular issue. This may be particularly challenging for a newly established information infrastructure as the one in the North Norwegian Health Authority. There were several concerns relating to having several governance organizations in charge of different parts of the same EPR system "If it was up to me technical and functional governance would be organized in the same unit to avoid the complications of defining all the necessary borders separating them creates, (leader of regionalization project)." Technical modifications often have potential effects on clinical issues as well as clinical adjustments may have effect on technical issues. The technical concerns of how to model archetypes, and how to connect it to for instance terminologies, will affect the clinical usefulness of these standards in relation to for instance how to reuse data and how to store the clinical information in the EPR system.

When it comes to archetype governance this organization is located under the regional clinical EPR governance, however the goal is for this to be an interconnecting link between technical and clinical governance of the EPR system. Establishing archetypes and archetype governance demands for a close collaboration between technical and clinical resources, since this is a new concept including both how to model the archetypes, and how to use them for clinical practice. This requires educating information architects to acquire the necessary competence on the border between technical and clinical relations and provide a better understanding of both sides of the regional EPR governance. Having an organization linking the closely connected clinical and technical issues of the new EPR system will increase the chance of the infrastructuring process of establishing a regional EPR system becoming a success. Hopefully this will contribute to a future smooth and well-functioning governance of the regional EPR system in the health region.

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