Establishing ICT Governance for Regional Information Infrastructures in Healthcare

Gro-Hilde Ulriksen  
Norwegian Centre for Integrated Care and Telemedicine  
Gro-Hilde.Ulriksen@telemed.no

Rune Pedersen  
Norwegian Centre for Integrated Care and Telemedicine,  
Telemedicine and eHealth Research Group, Faculty of Health Science, Arctic University of Norway  
Rune.Pedersen@unn.no

Gunnar Ellingsen  
Telemedicine and eHealth Research Group, Faculty of Health Science, Arctic University of Norway  
Gunnar.Ellingsen@uit.no

Abstract

Large-scale interconnected information systems frequently conceptualized as information infrastructures are very difficult to govern. In particular, healthcare contexts involving different collaborative institutions and departments that have diverging goals and policies make the situation even more complex. Based on information infrastructure theory and governance literature from the IS field, this paper contributes with empirical insight into the longitudinal and political process of establishing ICT governance in a heterogeneous healthcare context by focusing on the following research questions: What does it take to establish ICT governance in a heterogeneous healthcare environment? How do organizational politics and stakeholders’ interest shape the process? Empirically, we report from one of Norway’s largest ICT projects on healthcare, situated in the North Norway Regional Health Authority in 2012–2016.

1. Introduction

In Western healthcare, sharing health information across organizational boundaries has received increased attention over the last few years. This is done to ensure cost savings, efficient health services and patient safety. A key element in this process is how electronic patient record (EPR) systems evolve. There is an increased need for organizing EPR systems in a more structured and interoperable way, in order to communicate across heterogeneous healthcare practices [28]. New EPR systems are evolving from systems designed for information storage to user-centered work tools. These work tools includes structured information, decision support and standardized patient pathways for integrated care [12]. More interoperable EPR’s will provide decision- and policy-makers with better statistics, as well as enabling better-informed management—and policy decisions [29]. Standardization of technology and work processes is necessary to reach such goals. However, standardizing processes in healthcare, as many empirical studies illustrate, has been challenging and repeatedly ended in failure; see for instance Ellingsen et al. [19].

Aim of interoperability and standardization require a well-functioning governance organization. Traditionally, information and communication technology (ICT) governance organizations have a strong top-down decision setup related to standardized solutions [42]. However, this setup has rarely been effective or useful to healthcare [13, 27]. Given the increased ambitions of information sharing, healthcare, more than ever, is characterized by institutions with different goals and policies, different ICT portfolios in play and as a result, stakeholders with different interests. This scenario motivated exploring the actual process of establishing an ICT governance organization. Thus, the contribution of this paper is to provide empirical insight into the longitudinal and political process of establishing an...
ICT governance organization in a heterogeneous healthcare context. Based on this, we ask the following research questions: What does it take to establish an ICT governance organization in a heterogeneous healthcare environment? How do organizational politics and stakeholders’ interest shape the process?

Empirically, this longitudinal study follow the steps of the largest ICT projects in Norwegian healthcare. In 2011, the North Norwegian Regional Health Authority issued a bid for tender, requesting new clinical ICT systems for all 11 hospitals in northern Norway. The Health Authority established a regional project (hereafter dubbed BigProject) with a cost likely to exceed €100 million for the period 2012–2016. The EPR vendor involved (dubbed BigVendor) became responsible for developing a new region EPR for the Health Trusts, in close collaboration with BigProject.

Data was collected through qualitative interpretive methods [24, 40], which included open-ended interviews, document studies and participation in project meetings. Through this approach, we aimed to emphasize various viewpoints of the process in order to ensure deeper understandings of the challenges detected.

Theoretically, we applied information infrastructure theory; see [4, 20-22, 35], which has frequently been used to characterize and analyze large-scale integrated information systems portfolios. We also used ICT governance literature from the information systems field; see [3, 6, 17, 34].

The rest of the paper organized as follows. First, an introduction of the theoretical framework is presented. Next, we elaborate on the method. Further, we describe the case, including the BigProject and the new EPR. Last, a discussion emphasizing on different governance perspectives and methods of structuring an ICT governance organization aimed at managing large-scale information infrastructures is presented.

2. Theory

The goals of integrated care, evidence-based treatment and standardized patient pathways have led healthcare organizations to invest heavily in integrated ICT systems [8, 10, 26]. Accordingly, we are not dealing with just one system but instead with a portfolio of interconnected systems across institutional, departmental and professional boundaries. As a way of conceptualizing this idea, the notion of information infrastructure (II) is particularly useful [4, 19, 35, 37]. From a technical viewpoint, assembling an II involves designing, implementing, integrating, and controlling increasingly heterogeneous ICT capabilities [36]. Socially, creating an II requires organizing and connecting heterogeneous actors with diverging interests in ways that allow for II to grow and evolve [Ibid.). Furthermore, IIs are heterogeneous and open to an unlimited number of participants, such as users, vendors and technical components [20, 22], which is important for use in a healthcare setting. A particularly important concept is the installed base [20], which implies that an II is never developed from scratch but emerges and evolves from an installed base. When developing new EPR systems, this means considering the old portfolios and practices in Health Trusts. For the different parts of an II to communicate, standards are core elements [22]. Standards ensure high-quality care through best practices development [37], increased efficiency, as well as ensuring seamless patient trajectories over organizational borders [31].

A pressing question is how and to what degree an II in general and standards in particular can be managed at different levels of healthcare. In the II literature, several authors; see [18, 23, 32], have used the notion of infrastructure in order to emphasize the proactive engagement with large ICT portfolios. These insights are relevant for understanding the mechanisms for change; however, there has been less focus on the more formal governance of organizational structures and configurations of II. There is a need to establish ICT governance organizations that make decisions, as well as monitor results and performances [3] at different healthcare levels. Our focus in this paper is on interorganizational ICT governance at a regional level.

Most information systems had in-house ICT governance until the mid-1990s. Therefore, ICT governance has often been applied from an internal perspective [5-7, 33]. It is thus challenging to establish regional interorganizational ICT governance. ICT governance specifies the decision rights and accountability framework to encourage desirable behavior in ICT usage [41]. We adhere to the following definition of ICT governance: “The preparation for, making of and implementation of decisions regarding goals, processes, people and technology on a tactical and strategic level of the IT organization” [34]. Stars and Ruhleder stated that the configuration mechanisms of governance are typically a mixture of various structures, processes and relational aspects [35]. Implementing ICT governance contributes to ensuring successful delivery of healthcare [3]. The overall goal of an ICT governance organization is “to assure the stakeholders that things will go as expected and ensure the successful delivery of healthcare services” according to Beratarbide, and Kelsey [Ibid.]. Many ICT-related management
frameworks, methodologies and standards are in use today; see [3, 38]. None forms a complete ICT governance framework, but all have a role in assisting enterprises to more effectively manage and govern their information and related technologies [3], as well as identify ICT governance weaknesses.

Previously, a top-down approach with a clear ICT governance structure defining what decisions were necessary, and who should make them, was frequently used [42]. This design was promoted by management studies based on pre-defined models of work practices see, for instance, [1, 16]. However, such strong controlling ICT governance for defining and making significant decisions [42] has been ineffective and even impossible to apply to II in healthcare [13]. Several actors, on the clinical and technical sides of healthcare, need to be included in such governance. Due to the constant growth in complexity and deviation from original intentions, an II can never be completely governed in a top-down fashion [14, 22].

In interorganizational contexts (such as in our case), Van Grembergen et al. [38] suggest that ICT governance should include cooperation mechanisms to improve coordination of stakeholders with different ICT backgrounds (management and governance histories) and competence (ICT assets and resources) [15]. This because interorganizational relationships mature dynamically and collaboratively over various states [14]. The purpose of such governance is to ensure that organizations like Health Trusts have structures, processes, and mechanisms for collaboration, resolving disagreements, and organizing work on the interorganizational and organizational levels [15]. Improved quality and more interoperable health information is necessary, but very challenging to match with ICT governance principles and benefits in large scale interorganizational IIIs.

However, despite establishing cooperation mechanisms, the size and scope of an II may be a serious challenge to ICT governance. Heterogeneous stakeholders have different goals and strategies for reaching them, resulting in frequent tension. This is particularly evident in a healthcare context. As a result, regionalization processes may be extremely challenging to accomplish. An obvious challenge is the tension between standardization and flexibility recognized by Hanseth et al. [21]. However, flexibility is needed at the local level in a healthcare II, which enable users to work efficiently. In contrast, the regional perspective emphasizes a need for standardization and the ability to compare different units to run more efficient and cost-effective healthcare services. In this regard, Constantinides and Barrett suggest a polycentric governance approach in which different stakeholders are engaged in dynamic and adaptive governance processes [13].

Polycentric governance include organizing a number of governing units at diverging levels instead of one monocentric governance unit [27]. In such governance model, there is a distribution of decision-making across organizational layers and among a broad range of stakeholders, where each layer deals with associated subjects at a gradually larger scale and less-detailed level [Ibid.]. This way, different actors in an II (such as a Health Trust) participate in ICT governance by controlling parts of an ICT portfolio. Consequently, this may lead to a smoother regionalization process in which the actors do not need to give up all local control. One key advantage of polycentric governance is the possibility of creating general formed rules that can later be adapted to specific local needs [27].

However, this model does not represent a “fast track to salvation”; it requires that actors spend extensive time and energy on negotiating and compromising on acceptable collaborative solutions [25]. Even in cases where a common forum is established, it may be impossible to agree on governance structures acceptable to all parties because of the heterogeneity of interests and resources involved in healthcare IIIs [43]. In order to grasp the challenges of governing information infrastructures, it is crucial to understand the various interests and associated mechanisms and how they play out over time [Ibid.].

3. Methods

This study is positioned within a qualitative interpretive paradigm [24]. It contributes to a longitudinal qualitative study connected to a large-scale EPR project in the Northern Norway Regional Health Authority. Analysis of longitudinal research is a continuous and iterative process with an ever-changing intensity, focusing on developing and increasing the understanding of a phenomenon by exploring diverse viewpoints within a specific context [24, 40].

This Health Region consists of five Health Trusts with 11 hospitals. The regional EPR project (BigProject) has 25 employees and five sub-projects of which two focus on ERP. Participants from Health Trusts, local and regional management organizations, Regional Health Authorities and BigProject were interviewed to establish different viewpoints of the regional process. Since regional standards had not yet been implemented in the Health Trusts, interviewing physicians and other end-users was not required at this
point. Their perspectives will be more important to enlighten after completing the implementations of standards in 2015–2016.

The fieldwork build on the first author’s role working in the standardization of practice project for two years, in addition to participating in workshops, discussions and meetings for the project and the development of the new EPR. The data collection includes 11 open-ended interviews conducted in 2014–2015. All the actors asked, agreed to be interviewed, except one. The interviews lasted 60–120 minutes each. The interview guide was semi-structured with questions connected to the standardization of practice projects. This included pros and cons of standardization, why regionalization is important and what regional challenges remain after the projects are finished. There were also questions concerning challenges with establishing and organizing a regional ICT governance organization.

Table 1. Overview of interviewed participants

<table>
<thead>
<tr>
<th>Informant</th>
<th>Time</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four informants from BigProject</td>
<td>60–90 min</td>
<td>Laboratory, nursing, health secretary, technical</td>
</tr>
<tr>
<td>Three informants from regional ICT management</td>
<td>60–120 min</td>
<td>Technical, nursing.</td>
</tr>
<tr>
<td>Two local project leaders from Health Trusts</td>
<td>60 min</td>
<td>Nursing, occupational therapy</td>
</tr>
<tr>
<td>Leader from the local governance organization, UNN</td>
<td>60 min</td>
<td>Nursing</td>
</tr>
<tr>
<td>Leader from a Regional Health Authority</td>
<td>90 min</td>
<td>Economy</td>
</tr>
</tbody>
</table>

The first author transcribed the interviews. The text was further analyzed, and categorized into main issues. This was done by using the hermeneutic circle, moving from understanding parts of the process to understanding the whole process [24]. The challenges of organizing a regional governance organization, and how to deal with tension between different actors were some main issues. These issues were reflected on and discussed in relation to the context and the research questions. In addition, we supplemented the data analysis with project documents and reports to acquire the best possible outline of the processes.

4. Case

4.1 The Regional Strategy

After a prolonged bid for tender process in 2011, the North Norwegian Health Authority decided to invest in new clinical ICT systems for all 11 hospitals and at the same time regionalize the ICT portfolio. As a result, the Health Region established BigProject for the 2012–2016 period. With a cost likely to exceed €100 million [12], this project constitutes one of the largest and most ambitious ICT projects in Norwegian healthcare. The goals of the project were to establish
- Standardized clinical pathways,
- “Best practice” standards for EPR workpractice and procedures across the Health Region
- Clinical decision support
- Regional integrations and interoperability between clinical systems.

A crucial part of the project was to contribute to the development of a new EPR system (NewArena) using a completely new architecture with a user-centered configuration and structured clinical content. As the hospitals in the Health Region already had an up-and-running EPR system (ClassicEPR), a crucial part of this project was to establish a strategy for a smooth transition between ClassicEPR and NewArena. In the next sections, we elaborate in more detail on these efforts.

In this process, BigProject had the primary responsibility for handling the major activities. However, the existing regional ICT management organization was also ascribed a crucial role. Their 250 employees were responsible for delivering ICT services as well as running and maintaining the technical parts of the ICT portfolio in the Health Region. The regional ICT management collaborated closely with various sized local ICT organizations in the different Health Trusts. In addition, both BigProject and the regional ICT management collaborated with a regional clinical ICT advisory board established for handling the clinical content of the ICT portfolio at a regional level. The advisory board had representatives from all of the five Health Trusts in the region and met about once a month to provide strategic recommendations for the Regional Health Authorities. The advisory board acted as decision-makers for regional ICT issues and thus represented a temporary de facto regional ICT governance organization. Even so, it was a common understanding in the Health Region that the advisory board would be replaced with a permanent regional governance organization that worked on a daily basis when this organization was established.

4.2 Developing NewEPR
In 2012, BigVendor started developing NewEPR based on openEHR architecture. OpenEHR build on standardized information models, open source components and highly structured clinical content, including archetypes as core components [2]. Archetypes are structured data elements of clinical concepts, envisioned to ensure technology-independent interoperability, easy reuse of information and efficient decision support [9]. Experienced clinicians are responsible for defining the archetypes this way, the clinical personnel control what content to structure as well as how and when to do it. It is possible to build the entire internal structure of schemes, processes and decision support in the EPR by organizing all data in archetypes and combining them to form templates. There is a call for close regional collaboration to maintain and build the clinical content including patient pathways and archetypes for NewArena. The goal is to have a new EPR system working across institutional borders and follow the patients’ entire trajectories [31].

To support this organizationally, the University Hospital North Norway (UNN) established a regional archetype governance organization in 2013 with 10 employees. This unit will support clinical users in creating and maintaining the archetypes at various levels (locally, regionally or nationally). The regional archetype governance will be organized at an overall regional level in the new regional governance organization, independent of clinical applications like EPR, radiology and laboratory.

The Health Authority needed to decide on a strategy to combine ClassicEPR with NewArena, since NewArena is developed and implemented in modules over at least five years while ClassicEPR is still operative. This made it necessary to be able to manage two different EPR systems simultaneously, as well as ensure that users could switch seamlessly between the systems. Therefore, the regional ICT management implemented a technical solution to ensure that the old and new systems play seamlessly together. “A context sync is installed to make the switch between NewArena and Classic EPR seamless for system users. However, switching between two systems increases the risk of user errors and technical complications” (representative from regional ICT management). This change is technically demanding, as well as challenging, for users, as attention to what platform they are working on is required to accomplish their work [11]. After more modules of NewArena are implemented, some functionality will be in ClassicEPR and others in NewArena. In addition, technology and use are very different between ClassicEPR and NewArena. An example described by Christensen and Ellingsen [Ibid.] from the first pilot of NewArena illustrates this. The new system had structured data based on archetypes, but Classic EPR did not support structured text. Physicians created archetype-based documents in NewArena to plan operations. These documents were then sent to ClassicEPR, and secretaries included the documents in the surgery-planning module. Structured data registered in NewArena then became free-text documents, and the benefits of using archetypes disappeared completely [11]. This indicated that users might not experience actual benefits of NewArena until several modules have been implemented.

NewArena also calls for a much closer engagement with the user’s practice and more request for ICT support and governance closer to the end-users. This is grounded in the goal of designing clinical decision support and patient pathways and keeping them updated at all times. However, this task is impossible for the existing ICT management organization to provide due to its regional role and thus its distance from users. “The distance between the clinics and the regional governance organization is too far. It is cumbersome to get hold of the right person to solve a problem” (local project leader). To make this work, a governance organization is required. In the first pilot of NewArena, the surgery outpatient clinic made it clear that users would require close follow-up in their engagement with the new functionalities for them to be useful.

4.3 The Standardization of Practice Project

To prepare organizationally for the new system, and attain the Regional Health Authority’s goals of higher quality, efficiency and interoperability, regional standards and routines for EPR usage had to be established. Standards are important for a large II such as a Health Region to function. Big Project’s standardization of practice project was therefore initiated in 2012. The goal was to “increase quality and safety in patient treatment through standardizing clinical practice related to EPR usage across the region” [29]. More than 500 system users from all 11 hospitals in the region participated in mapping EPR usage and establishing regional standards in 2012–2013. The project identified existing work practices (the installed base) at all hospitals and used a best practice principles to standardize work routines and procedures. In addition to system users, the EPR vendor and regional and local ICT management organizations participated in this process. The implementation of the regional standards will be completed in 2015–2016, including areas such as organizational configurations, journal structure, access control, laboratory work and workflow [30].
The regional standards will lead to extensive changes to the different hospitals’ work practices. For example, after the standards are implemented, a new form of access control to the EPR will be applied. Today, what users in the different hospitals automatically have access to vary. For some, this new admission control will give automatic access to less of the EPR than they have today. Another change is that all hospitals must register equivalent activities at the same organizational level, making information easier to compare at the regional level.

“Establishing the regional standards is a success, leading to better collaboration within the Health Region than ever before” (project leader, BigProject). However, some standards have been difficult to agree upon. An example is registration. The regional standard says, “Registration is connected to the patient’s illness” [Ibid.].” This means connecting all practice to a specialized field such as ear, nose, and throat or neurology. A project leader at BigProject states: “At a small hospital, activity registration can no longer be connected to the clinician doing the job but rather the illness of the patient.” With the regional standard, all registration of activities is done regionally, since all hospitals in a Trust share the departments and sections connected to different specialized fields. This way, the Health Authorities have an improved overview of all activities in each field. However, hospitals no longer have the same local overview. Local hospitals do not see the benefits of changing their registration practice in a way that leaves them with less local control of their data. They have attempted several times to reach an agreement about this matter without any luck so far. Similar challenges are likely to appear after implementing the standards, and the users see how the standards actually affect their workday. Project leaders in the BigProject emphasize the need for a regional governance organization to form a strategy for handling such issues, as well as others related to aberrations, modifying existing, or forming new standards. Without a governance organization in place, they fear that the regional structures will fall apart after BigProject is completed. “Regional decisions have already been effectuated, and there is a risk of them dissolving without the necessary regional governance in place” (project leader, BigProject).

Consequently, there is an increased need for a well-structured interorganizational ICT governance organization at the regional level to follow up on the results of the standardization of practice project and prepare for NewArena. Working out an overall goal for regional ICT management, including what to do and how to get there, is necessary. “It may take several years and the process may need to be done in steps, but to move forward, we need to have a strategy stating what the region wants this organization to encompass” (project leader, BigProject).

4.4 Establishing a New Regional Governance Organization

When the Health Region in 2011 decided to regionalize the ICT portfolio and established BigProject, they also started working on forming a regional ICT governance organization. However, it was difficult to negotiate the nature, form and location of this organization, preferably with the authority to enforce standards for the various Health Trusts as well as strategically manage a large ICT portfolio.

The experiences and lessons learned with the regional ICT management was that this organization could not sufficiently support clinical practice and thus be responsible for regional ICT governance. There is a clear difference between ICT governance and ICT management. ICT management focuses mainly on supplying ICT services and products and managing ICT operations [17]. ICT governance is much broader and concentrates on performing and transforming ICT to meet present and future demands of the business and the customers [Ibid.].

Today, all Health Trusts, and especially the largest Trusts, have well-functioning local ICT management organizations due to the need for user support and governance close to the workers. The local ICT management at the University Hospital also emerged as a de facto organization for clinical ICT management, preparing for the future clinical governance of NewArena as well as being a key player preparing UNN for developing and piloting the new EPR system. “My guess is regional functional governance is placed in the biggest Health Trust, they already have an established organization for governing both NewArena and ClassicEPR” (leader, BigProject). Giving up local control and ICT management for a newly established regional ICT governance organization did not seem like a tempting offer. However, even if the users agreed on the need for local clinical governance (i.e., the local ICT organization), the actual content of this governance was far from clear. At one point, this resulted in a territorial dispute between the local ICT governance at UNN and regional ICT management. The regional ICT organization locked out the local ICT management from the administration tool in ClassicEPR (user management, access, role definitions etc.) with the argument that this was a technical issue. The local ICT management, however, claimed this tool was part of the clinical ICT
governance and demanded continued access. They also supported their claim by implicitly referring to the regional ICT management’s managing role: “It is the Health Trust that owns the system and decides who gets access to what” (leader, local ICT governance). This indicated a strong need for a regional ICT governance organization to handle these kinds of issues.

After discussing several suggestions, in 2013, the Health Region agreed that the University hospital should complete a proposal for organizing regional ICT governance. In 2014, UNN suggested a fragmented governance model in which each Health Trust would be responsible for governing areas of the ICT portfolio on behalf of the others, meaning that one Health Trust would govern the EPR; one would govern the laboratories, another radiology and so on. This model was based on the discussions in the Health Region for the following reason: “Many discussions have been about whether it is necessary to have a small governance unit in each Health Trust or one regional governance unit” (leader, local ICT governance organization). This solution provided all Health Trusts with governance competence and some local control. The Health Authorities piloted this governance structure for radiology in 2014–2015. After an evaluation, they will decide whether to apply this fragmented model to the rest of the ICT portfolio. This model is in many ways comparable to a polycentric governance model. Governance is spread out in the organization instead of assembled in one unit [27].

The informants were skeptical to whether such fragmented model could be applied to EPR governance since the EPR is very complex and has many integrations and interconnections with the rest of the ICT portfolio. EPR governance must include a large group of technical and clinical personnel in addition to the personnel who work specifically with archetypes and modeling for NewArena. How to organize this and how to separate EPR related clinical content is complicated to work out. “The systems are so closely interconnected, especially the EPR and the laboratory, that even if the Health Trust agrees to split their governance this seems impossible without compromising the interoperability” (project leader, BigProject). Even with all the skepticism, this model was suitable for defining who was responsible for different clinical areas. “It seems like the best solution the region is able to agree on for the time being” (representative, Regional Health Authority). A fragmented governance model was at least a starting point for regional collaboration on governing an interorganizational ICT portfolio. In addition, establishing and updating regional patient pathways across Health Trusts, primary care and other institutional boundaries will be an extensive part of the regional ICT governance.

5. Discussion

De Haes and Van Grembergen state that ICT governance contains a mixture of various structures, processes and relational mechanisms [17]. We agree, but we emphasize that governing an evolving II should be less concerned with creating uniform organizational structures for generating order and focus more on a process for handling diverging political interests and managing tensions and complex interdependences. This case has illustrated that establishing a uniform interorganizational governance regime is a formidable, if not impossible, task. Taking into account previous research on complex II [4, 20, 22, 35], the current outcome is far from surprising. Modern IIs have become increasingly more interconnected and interdependent. At the same time, ICT systems, and in particular EPRs have been increasingly included in local practice. Thus, the infrastructure must serve regional and local interests simultaneously. In this case study, this is expressed by tailoring NewArena to the clinical practice through the new openEHR architecture. At the same time, the Regional Health Authority aims at standardizing practices across the Health Trusts in the region.

The two perspectives of the regional portfolio call for different sorts of governance: NewArena requires a governance regime grounded in local practice with high competence in how the new technology affects the clinician’s daily work. Thus, consider how the first pilot of NewArena at the surgery outpatient clinic made it clear that the users would need close follow-up in their engagement with the new functionalities. In contrast, Big Project’s standardization of practice calls for a more authoritative governance regime. The regional standards and routines must be implemented in clinical practice, and someone must make sure that the users adhere to the standards and that the standards continue to evolve alongside clinical practice. At this point, the regional ICT advisory board and the regional ICT management organization are not equipped to handle such a governance task on a permanent basis, since they are management, not governance, organizations. A more powerful interorganizational governance organization operating at an overall level on a daily basis is needed to support successful delivery of healthcare.

In addition, governing an II also implies taking into account and building on the existing ICT portfolio, the installed base [20, 28]. The BigProject leaders have considered the existing system with their current
strategy to plan for years of interplay between ClassicEPR and NewArena. This enables seamless integration of NewArena by replacing ClassicEPR in a stepwise manner and avoiding a “Big Bang” implementation. Operating the two EPR solutions simultaneously, however, has created challenges, such as the example from Christensen and Ellingsen [11] in which a process moved from NewArena back to Classic EPR resulting in an outcome that is the same as today; thus, no improvements in NewArena are detected for users. The benefits for users may not be noticeable until all parts of the old system have been replaced.

From a governance perspective, a key point is that the interplay between the old and new portfolios require thorough technical insight. Simultaneously, such a technical perspective is closely connected to clinical practice since technical and clinical decisions affect each other. Consequently, governing an II implies being able to understand and take into account different areas where each part requires a unique governance regime. The three governance perspectives introduced in this paper, the local, the regional and the technical, do not exist independently. Changing one area of the infrastructure may result in unpredicted changes to other areas [39]. These interactions may cause tensions and conflicts of interest. For example, pushing too heavily on a regional perspective and standardization may have unforeseen effects on local flexibility. An example is how physicians at small hospitals lost local overview and authority of their patient data when the standardization of practice project implemented regional standards. Consequently, something that is very useful from a regional perspective becomes a liability for local practice. Accordingly, based on the preliminary results, there are indications that regional ambition has been pushed a step too far, as the different Health Trusts could not agree on how to organize a governance organization able to serve all the various needs. Given New Arena’s heavy influence on future work practice (decision support, patient pathways, structured EPR content, etc.), it is not surprising that the Health Trusts sought highly competent local ICT governance close to clinical practice instead of related to a newly established regional ICT governance organization.

A strategy for solving the local and regional challenges has been to divide the governance into smaller domains such as EPR, radiology and laboratory, etc., where each domain is anchored in one of the Health Trusts instead of at the regional level. This solution is similar to a polycentric governance model with multiple governing units and several overlapping arenas of authority and responsibility [13]. To some degree, this may solve the local/regional tension within the specific area in question. A key challenge with the fragmented governance structure suggested is defining the boundaries and areas of responsibility between the different units. Thus, several independent organizational units end up controlling areas of the same system and the ICT management organization that delivers technical solutions would have to collaborate with several Health Trusts. In addition, some parts of the ICT portfolio, such as EPRs and laboratories, are so closely connected that separating them may seem impractical and impossible. Another challenge may be if two governance organizations disagree on a topic. Who decides the outcome? These borders are not clear-cut (as we have pointed out) and require cumbersome negotiation between areas of responsibility, thus making governance a complex task to handle. Such fragmented governance models have been impossible to agree on in the past according to McGinnis [27].

Even in cases where a common forum has been established, it has been impossible to agree on governance structures acceptable to all parties, since heterogeneous interests and resources are involved in a large scale II.

One of the goals of NewArena is to operate across institutional borders to follow a patient’s entire trajectory gathering all necessary patient information in one place. The fragmented governance solution suggested made embracing NewArena extra complex. Governance of NewArena demands a regional focus on clinical content independent of system vendors, leading to an increased need for regional ICT governance. There is a call for close regional collaboration to maintain and model the clinical content, including archetypes and templates. It is necessary to take into account the goals of the new system when the interorganizational ICT governance organization is established. This indicates that trying out the suggested polycentric governance model will potentially create room for endless negotiations and a constant need for compromises. However if this model is chosen a key success factor is to clearly define, who makes the final decisions when the different governance organizations disagree. If not, it will be damaging for the whole II, and it will be challenging to assure the stakeholders that things will go as expected. In addition, it is necessary to make an overall strategy securing the appropriate handling of all necessary areas of interorganizational governance.

6. Conclusion

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Given the increased ambitions of information sharing, standardization and interoperability, to ensure successful delivery of healthcare it is crucially important to establish a well-functioning II. A key factor for success is establishing an ICT governance organization. We have discussed several challenges of how and to what degree an II in general and ICT portfolios in particular, can be managed, by focusing on organizational structures and processes on how to formally govern II’s. We emphasized the longitudinal and political process of establishing an interorganizational ICT governance in a heterogeneous healthcare context.

The goal of today’s EPR systems is to evolve from information storage systems to interoperable user-centered work tools. Standardization of technology and work processes as well as interorganizational governance collaboration is necessary to reach such goals. The regional ICT governance organization must operate on a daily basis, make decisions, as well as monitor results and performance on different healthcare levels. In addition, standards must evolve alongside the EPR to be useful.

For such ICT governance organization to succeed an overall strategy for want to include in this organization must be worked out by the Health Authorities and the Health Trusts. Interorganizational ICT governance has to maintain different aspects of governing the regional ICT portfolio, including local, regional and technical aspects and the ongoing tensions among them. Regionalizing an ICT portfolio is challenging, and even if representatives from Health Trusts, ICT management organizations and vendors participate in the process, the standards established might not always fit local needs. Therefore, a strategy for handling regional disagreements and for evaluating requirements for revising and adding standards is also important to work out. In addition, it is necessary to define the structure of such ICT governance organization.

The fragmented governance model suggested for the North Norwegian Health Region is similar to a polycentric governance structure, which offers opportunities for organizing several governing units at diverging scales instead of one monocratic governance unit. This is an attempt to get a step closer to regional collaboration and seems to be as far as the Health Trusts are ready to go for now. Using this model, they do not have to give up all local control of their ICT portfolio. A fragmented governance solution demands close collaboration and clearly defined borders between the different actors. This implies that a polycentric ICT governance structure may be an acceptable but challenging solution for a loosely connected II as a Health Region.

References


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