

Introducing adaptive co-management: A toolbox for II governance and research?

Abstract. Based on results from a healthcare IS study, this paper suggests the adaptive co-management framework as exceptionally pertinent to the complexity of healthcare information infrastructures. Originating from the domain of environmental governance and natural resource management, the framework is based on decades of practical experience, and current applications range from research to governance and management practices in this domain. The paper illustrates the framework's analytical capabilities, and suggests a corresponding practical potential as relevant to action and design research. The paper concludes by pointing to this as an opportunity to resolve scalability issues related to participatory IS design and implementation.

Introduction

A tighter integration of health care services is currently high on the public agenda in many countries around the world. Concepts like 'shared care', 'continuum of care' and 'seamless patient trajectories' have been introduced to illustrate visions of a smoother process flow across and between institutions involved in providing patient care at different levels of the health care system (Ellingsen & Monteiro 2006). Information and communication technologies (ICT) are envisioned to play a key role in achieving this. Merging hospitals into larger organizational units is also considered pertinent in this regard. When two major Norwegian hospitals were merged in 2009, one of the hospitals alone was running approximately 1.200 different computer applications, where about 300 of them were clinical information systems. A project initiated to resolve the issues this raised in regards of integration was terminated in 2010 after considerable expenditures. The failure was by the project manager attributed to underestimated complexity:

“The project was more complicated and required considerably more time and effort than anyone had anticipated. The project would have been planned somewhat differently had we known all the composite challenges in detail from the start.”¹

As this statement points out, the project was complicated, the challenges were composite and both were unanticipated. This provides an apt illustration of how ‘complexity’ is commonly perceived as a ‘show stopper’ to the visions of integrated healthcare systems. While the integration of a fragmented healthcare system rests on an integrated information infrastructure (II), efforts to operationalize this unveils that the infrastructure and the information is fragmented too, and that integration is equally challenging at this level. Healthcare information systems committed to the visions of integration face the same complexity as any other instantiation of such systems. They also face additional complexities related to the need for a coherent, cross-context II. Managing this composite complexity has proven a major challenge to realizing the visions of an integrated healthcare system. How can this be understood and subsequently amended? Based on findings from research in the same context as the above mentioned hospital merger, this question is elaborated here in light of the adaptive co-management framework (Armitage et al., 2007) from the socio-technical perspective on IIs as defined by Hanseth and Lyytinen (2010).

Adaptive co-management

Adaptive co-management (ACM) research is concerned with structures, processes and their interrelations in the management of complex socio-ecological systems (Armitage et al. 2007). Drawing on commons theory and complex adaptive systems (CAS) thinking, ACM theorizing foregrounds non-linearity, feed-back processes and system self-organization. This has challenged established assumptions of scientific certainty, stability and the primacy of expert-driven solutions in the domain of environmental governance and natural resource management. ACM is thus described as an institutional and organizational response to CAS and the challenge of resilience management, and as an emergent property of complex systems (ibid).

Collaboration, learning and multi-level governance are main pillars in the ACM framework. While the latter concerns the structural arrangements for collaboration, learning and subsequent decision making, the two former are more concerned with the processes themselves. ACM foregrounds learning as a social activity (Berkes 2007, Plummer & FitzGibbon 2007), spurred by collaboration in networks of diverse stakeholders and through the institutionalization of arenas for problem solving and decision making. Learning by doing is a central aspect in the ACM conceptualization of learning (Plummer & FitzGibbon 2007). Effective

¹ <http://www.idg.no/computerworld/article208401.ece?curPage=2> (My translation)

learning is considered something that necessarily has to take place through cross boundary, and most often multi-level, collaboration and problem solving. The solutions (and often even the problems) are seldom given a priori or defined by any single (group of) stakeholders, but must be collaboratively defined through continuous negotiations and experiments. The learning *processes* are equally important as their *outcomes*, as these serve the purpose of trust building as well as legitimizing and anchoring the definition of both problems and solutions in the broader social context of diverse stakeholders.

ACM practices unfold in "communities of interdependence", where both the autonomy of its constituencies and their dependency on the community is acknowledged: "The community of interdependence celebrates diversity as enriching and recognizes the existence of excessive power differentials as a potential threat to community" (Kearney & Berkes 2007, p. 192). Polycentric institutional arrangements (Ostrom 2005) are considered a prerequisite for balancing centralized and decentralized control. This is achieved through nested, quasi-autonomous and self organized decision-making units, connected through networks that provide horizontal and vertical linkages within and between levels of governance.

The EMC project

The Electronic Medical Charts (EMC) project was initiated in 2004 as an IS implementation project at Rikshospitalet, the National University Hospital in Norway. The project objective was to replace the existing paper based medical charts and to support 'continuum of patient care' across the hospital by providing a unified interface to vital signs and medication information for all involved care providers. In 2007, this project merged with a similar project at another hospital (Ullevål). When the two hospitals merged two years later, the projects were both devoured by a third project, previously initiated by the regional authorities that also served as the formal owner of the two hospitals. The EMC project was initially depicted as a simple case of IS implementation. But it turned complicated and complex. It also turned out to be a development project rather than an implementation project. Throughout this process, the visions of an integrated healthcare system had a significant influence. Appendix 1 presents an approximate chronology of major events at national, regional, hospital and project levels that came to have an influence on how the project evolved from 2004 to 2012. My fieldwork was conducted from 2007-2012, composed by in-depth interviews, observations and document studies, continuously subjected to an interpretive analysis regime. During this period the project went from failure to success, and the project design went through continuous changes and several transitions. From an initial techno-centric structure that basically modeled the project's command-and-control lines, to an elaborate eco-centric structure that modeled the implementation domain. This development was also reflected in the

formal organization charts (figure 1). The following is a condensed analysis of the outcome of this transition based on ACM concepts.

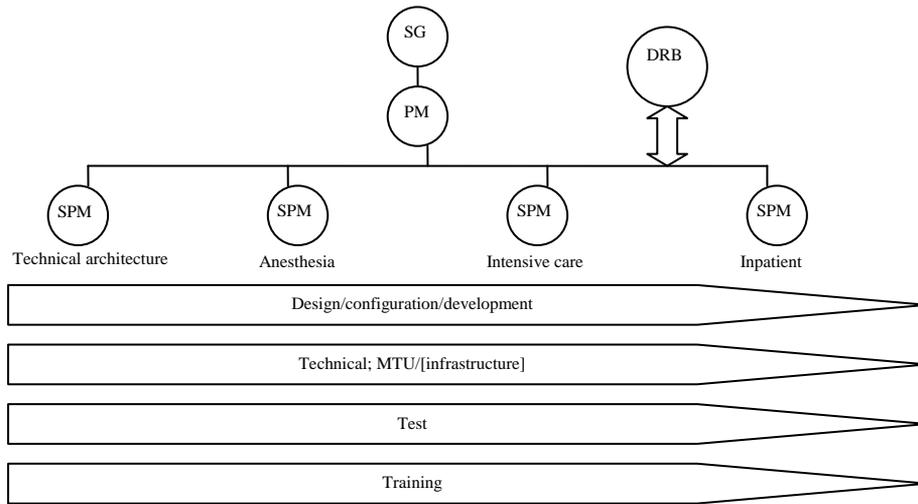


Figure 1. Formal project organization, February 2012

The EMC project was developing a solution for ICU, anesthesia and inpatient wards, and it was implementing a new technology. These four ‘constituents’ in the implementation domain were reflected in the project’s governance model. A central project objective was to strengthen integration across these units in the implementation domain. The technology was intended to establish new or different interdependencies and interactions. Corresponding interactions and interdependencies were established in the governance model through work streams that involved all units in the governance model in each of the work streams. The work streams functioned as horizontal linkages that enabled collaboration, learning and informed lower level decision making and execution.

Each unit in the governance model was appointed a sub project manager who was part of the unit. Through the project manager, they established vertical linkages to the project steering group for feed back and feed forward that supported and informed higher level learning, decision making and execution. The design review board was established as a polycentric institution for resolving issues that required consensus involving levels the basic governance model didn’t cater for. This institution was polycentric in the sense that it involved decision makers that were empowered by a range of diverse stakeholders at multiple levels. All major design decisions had to be approved by them. This ensured a stakeholder involvement that spanned the community of interdependence as a whole rather than just the current operational domain. As opposed to the initial project model, this model worked.

Implications for II governance and research

The application of an ACM perspective on II governance as resilience management foregrounds governance architectures and processes that enable sense-and-respond management. At IS project level II governance is thus about attending to “the broader social contexts of creating the conditions for social coordination that enable adaptive co-management” (Olsson, 2007, p. 269). This is easily attuned to the notion of organizational implementation (Hertzum, 2002), and could thus be engaged in order to enhance our current understanding of this phenomenon. While I have only had the opportunity to use the ACM framework for analytical purposes, its potential for action researchers and design research seems promising. It is my contention that ACM might contribute towards resolving the identified scalability issues related to participatory IS design (Simonsen & Hertzum, 2008). Our current tools seem to fit well in this ‘toolbox’.

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Appendix 1: Approximate chronology of major events

- 2004** The health ministry announces Te@mwork as the national strategy for healthcare IT. The EMC project is conceived at Rikshospitalet under the umbrella of ‘the Digital Hospital’, and a requirements specification is developed.
- 2005** A pre-qualification round is completed in cooperation with the hospital’s procurement department.
A project manager is appointed in the hospital’s IT department, and a bid for tender is initiated.
- 2006** June: A contract for MetaVision is signed with its vendor, IMD soft.
Considerable efforts are put into installing the physical infrastructure (PCs, wiring, etc.), configuring MetaVision according to anticipated requirements (defining parameters and designing user interfaces) and training the users. The clinical department is allocated the task of nominating candidates that would receive additional training, and thus function as super users that could provide additional supervision to others in how to use the new system.
December 5th: a pilot is launched in the thorax surgical department. Problems are encountered that threaten to halt the project.
- 2007** January: a new project manager is hired from outside the hospital.
Her evaluation of the pilot results in a 22 page experience document. It points to several problematic issues, including:
- Underestimated complexity of organizational conditions
- Lack of channels for communication and distribution of decisions and responsibilities
- Lack of time allocated to the project
Thorax revokes the paper charts.
A second hospital – Ullevål – joins the project.
The project is redefined from an implementation to a development project. The time schedule is renegotiated and the project is restructured:
- The ‘standardization project’ is established
- A clinical council is established
- Different work streams are formalized
- Decisions are made collaborative, closer to their execution. A ‘war room’ is established
- Focus is moved from Thorax to Anesthesia.
- 2008** Te@mwork is replaced by Teamwork 2.0, down-sizing the level of ambitions.
The project is busy standardizing.
May: Ullevål stops their project due to budget cuts.
October: the Regional Health authority signs a framework agreement for MetaVision.
November: the decision is made to merge the two hospitals, effective within two months.
- 2009** A successful implementation is completed in Anesthesia, and the project moves on to the Children’s ICU.
A manager is hired for the regional project, but his hands are tied due to the hospital merger and other regional reorganizations.
The merger is a fact, and battles over positions in the new organization take off. Ullevål gets to appoint a new manager for the EMC project. The regional steering group decides that he should lead the regional project as well.
- 2010** January: the projects merge under the governance of a single manager.
Project activities are stopped in Rikshospitalet.
The regional project organization is reworked into a matrix style model, attuned to clinical needs rather than technological problems.
- 2011** A regional pilot is conducted in Ullevål’s ICU and Anesthesia. It goes over schedule, but is still considered a success.
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