NK 73  Monday 9/12 at 1500

Model

ANT

CAS

Copy & Paste Abstract + Grouvin plan from #4 to chapter 4.

Kapitel 5 – Herneide til byen 1, 2, 3.
HMS

building health inform offices

NR 34 Monday 21/11 46 15:00
Designing quality management systems in complex environments: An action research approach

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1 Introduction

Quality management systems and process improvement systems are special cases of information systems, and they are often difficult to implement successfully. In the case of software process improvement (SPI), some studies indicate that about 70% of such systems tend to fail (SEI, 2002). While there was much talk of a software crisis in the 1980s and 1990s, suggesting that it could be solved by chaotic practices being replaced by more systematic ways of doing things, for the past 15-20 years much of the discussion has been related to the topic of how the modern world and our computer systems are getting increasingly complex (ref).

By reframing the problem as a complexity problem, there has been a rise of literature on information systems, software engineering and quality management borrowing or building upon theories of social and technical complexity from domains like anthropology, economics, biology, engineering, computer science and so on (e.g. Kelly, 1994; Axelrod & Cohen, 2000). Often such theories are primarily useful for descriptive research, but within the context of Scandinavian information systems action research there has been a large volume of publications arguing how the development of the Internet can be used as a descriptive model for understanding the nature of software and systems development in complex environments and also give normative guidelines on how to go about with IS design.

Although this approach has produced valuable results, both in practical and theoretical terms, when studying systems design and organizational change, the approach has not yet been properly tested in the case of designing SPI systems or, more generally, total quality management (TQM) systems.

The purpose of this thesis is to address the following two questions:

- RQ1: To which extent does knowledge about the dynamics associated with the socio-technical development of the Internet provide insights on how to
understand the socio-technical complexities in the context of designing and implementing quality management systems?

- RQ2: To which extent is it possible to derive practical strategies for designing and implementing quality management systems based on such insights?

The empirical research design for this thesis is based on trying to provide insights on these questions based on action research or intervention management reconceptualized through the lens of action research covering the period 1999 to 2010 as the author was first working as a quality manager and then as a quality management researcher at the Norwegian Tax Administration (NTAX).

The structure of this thesis consists of following this introduction chapter with a chapter two for looking more deeply into the theory and related literature on the information systems model indicated in this introduction in order to specify more clearly how the empirical research may contribute in adding insights to specific aspects of the model. Chapter three will then give more detail on the empirical context and a more thorough explanation of how the action research has been designed. The PhD work has resulted in twelve scientific publications, where six of these will be presented results chapter while the remaining papers will be used as reference for explaining the process of work and how some ideas have developed. Although the main contribution of the research is to be found in each of these core papers in chapter four, the purpose of chapter five is to discuss the papers in the broader context of how the specifically contribute in the context of using the internet as a model for systems development. Conclusions, main findings and plans for further research are presented in the final chapter.

RQ3: What gets measured gets done
2 Theory and related research

The overall idea is to give a broad presentation of how certain parts of the literature on Information Infrastructure (II) has been used in the context of HISP (or other action research projects?), suggesting how key ideas like conflict theory (ANT; Latour, Callon), reflexcivity (Giddens, beck) and complexity theory (CAS) suggest a framework for design of TQM systems and SPI systems.

2.1 Culture, power and politics in IS design

Within the field of IS, there is a large body of literature addressing issues of culture, power and politics in IS design, typically addressing problems like user involvement (Bratteteig; SCIS paper on “engaged scholarship”). In the theory of information infrastructures, politics also play an important part, although mostly in an indirect manner in terms of trying to understand how standards are established and how technology embodies power rather than the more explicit power analysis that was quite popular in the 1970s and 80s (e.g. Braverman, 1974).

Not specifically relating to information systems but on a more general level of systems theory (oerations research etc), Jackson & Flood (1989) contributed to the development of Critical Systems Theory (CST). CST is a large body of literature that fills several books and hundreds of scientific papers, but in the context of studying TQM and SPI from the viewpoint of II makes it interesting to start with a comment made by Stafford Beer (1968) about operations research having the unfortunate effect of making scientists and managers into “natural enemies”.

![Diagram](image)

*Figure 1. The SPI game represented by the groups of players as seen from the auditors' perspective*
In other words, rather than emphasizing the much described line of conflict between management and workers (e.g. software engineers), issues of culture, power and conflict in this thesis will primarily focus on the power games where the “scientist” (quality auditor, change agent, quality manager etc) is the focal point.

2.2 Structuration theory

Orlikowski and Baruda (1992?) wrote a research commentary questioning the theory and methods used by the IS community in investigating the role of information technology in IS research. By going through volumes of publication and classifying research into groups, they argued that far too little theory provided insights on the relationship between technology and society. In their opinion, Anthony Giddens’s was an example of how to address this issue, something that contributed to a trail of researchers working using Giddens’s “structuration theory” as a basis for social analysis in the context of IS research.

Other researchers (e.g. Hanseth & Monteiro, 1995) have questioned how much Giddens really talks about technology and have suggested actor-network theory (ANT; Latour, Callon, ...) as an alternative approach. In the internet model of ISD, however, both Latour and Giddens are used for providing ways of using the model for analysing social aspects of ISD. In figure 2 I present my understanding of how structuration theory, ANT and the theory of complex adaptive systems (CAS) fit together in II theory.

![Diagram](image)

*Figure 2. How II theory mixes structuration theory, ANT and CAS*

In figure 2, the cycle between how our social structures enable our actions and how our actions contribute to social structures is meant to be a simplified illustration of one of the main ideas in structuration theory. When II theory builds upon this theory, however, they often use ANT for analysing actions, providing a structures in the shape of actor-
networks that stresses the role of how power and negotiations are conducted. When suggesting how such insights can be used for practical design, often the language of CAS is used (Hanseth & Braa, 2000).

However, structuration theory and model in figure 2 is of limited use in the case of doing action research, as action research means that the researcher is not only observing ISD projects or how technology behaves in the world in general, but the idea is to use the acquired structure for producing real action. This means that the cycle in figure 2 needs to be interpreted on a more concrete level, meaning that mapping out the ISD context with ANT produces a model of the design problem that is used as a basis for CAS design or for development of CAS theory (Braa et al., 2007; Shaw, 2009).

2.3 Reflexivity

Giddens and Beck write about how the solution of one problem leads to new problems, thus modernity being like a machine that continuously builds complexity and risk (Ciborra et al., 2000). In the context of designing quality management systems, this aspect is particularly important as quality management standards like ISO 9000 require such self-referential loops to be working.

One of the TQM design ideas that I would like to investigate further is to which extent people within the field of quality management actually believe in following their own standards, and whether this design principle leads to improvement or complexity and risk.
3 Method

3.1 Action research

Rudestam & Newton (1992) suggest Action Research (AR) for investigating organizational efficiency. The way I have formulated the research questions RQ1 and RQ2, the first question deals with theoretical understanding while the second question deals with practical implications.

Action research is sometimes accused of being a somewhat problematic research framework (e.g. Järvinen, 2007). As some find the claims made about new knowledge produced by action research to be questionable, many articles and books have been written about how to understand AR in philosophical terms, explaining how it is different from positivism, how it relates or does not relate to design sceicen and so on.

In the case of II theory there is also a questionable mix of different types of theories, some ideas taken from economics where they are represented as systems of differential equations where others come from phenomenology or etnography etc. In order to use II as a framework for action, I believe it is necessary to interpret AR in a way that allows to a mixture of seemingly philosophically incongruent theories. Based on a philsoophical argument made elsewhere (Øgland, 2009), I suggest the following AR model.
3.2 Data collection

Following the conventions of action research, the problems and data collection processes have been related to practical problems in organizations where I have been practically involved. Although I have drawn upon experience from designing a quality management system at the Norwegian Meteorological Institute (1992-99), the main bulk of data have been collected from the Norwegian Tax Administration (1999-2009), and some minor experiments at the University of Oslo (2006-2009) and some triangulation of data by interviewing the quality manager at the Diakonhjemmet Sykehus (2009) and doing interviews and questionairs during the annual ISO 9000 quality management conference QUALIS in 2006.

3.2 Data analysis

A mixture of methods have been used, including attempts to make sense out of interviews and observations, statistical methods used for data analysis within the domain of quality management, but mostly attempts to make sense out of my own experience of being part of designing and evaluating quality improvement interventions.
4 Results

The research design has resulted in the publication of twelve scientific papers, nine conference papers and three journal papers. One conference paper was given a Best Paper Award, while two others were nominated for Best Paper Awards. For the purpose of the thesis, however, only six of the papers have been included.

4.1 Paper 1

...

4.2 Paper 2

...

4.3 Summary / analysis

The Ishikawa fishbone model is a standard model within quality management for analysing causes of problems. In figure 4 I have chosen the main sections of the ISO 9001:2008 standard for branching the diagram, suggesting how difficult reasons for breakdown of TQM projects can have been caused by issues described by chapters 4 to 8 of the quality management standard.

Figure 4. The Ishikawa fishbone model of problem-cause analysis

Typical reasons for TQM projects to fail are often described as lack of management commitment, lack of quality awareness within the organization, lack of competence
among designers and implementers of the QMS, lack of measurements, wrong measurements or faulty use of statistical methods,…

As can be seen, each of the typical problems can easily be mapped onto the fishbone diagram, and the purpose of this literature review is to produce an overall
5 Discussion

The purpose of the discussion is to show how the papers fit together, supporting the framework I should have presented in the literature review.

5.1 Fake quality and real quality in dual organizations

Most of my papers deal with organizational politics.

- HAMLET-paper has been compared with Latour’s ARAMIS-book. It is probably the closest thing to ANT I have written.
- PAC-MAN paper describes conflict between managers and quality personnel. Unlike the HAMLET-paper, this is a CAS-type paper where the idea is to produce insights on WHAT TO DO.
- FAKE QUALITY-paper (ECIS-2009) uses CST and describes the conflict by using Plato’s metaphor of climbing out of the dark cavern as we build knowledge.

The first step in Lewin’s action research approach is to conduct some kind of assessment of the organization, in order to find how what the tensions are like, how these may be unfrozen in order to carry out some kind of intervention and the re-freeze the organization again. This is a approach that fits well with conventional quality management wisdom (Deming, 1986; Juran, 1988 etc).

However, in the context of what Brunsson describes provocatively as “hypocritical organizations” or more neutral as “dual organization”, it may be very difficult to discover the sort of tensions we are looking for, the general idea being that the organization and its surrounding network has fooled itself into believing that everything is perfect or at least under control and continuously improving. This is the situation I address in the ECIS-2009 paper, arguing that critical theory or the type associated with people like Adorno and Horkheimer should be used for describing the organization in a way that makes sense for the person in charge of quality management. Whether the others involved sustain their beliefs in the socially constructed “fake quality” or not, is not an important issue. What is important is that the people in charge of quality management are given the
opportunity for measuring the organization and thus contributing in creating "breakdowns" in the false believes among workers and managers. One of the slogans among the people involved in Scandinavian participatory design has been "breakthrough through breakdowns" (Madsen, 1989). In the ECIS paper I argue and illustrate how this can be used as a systematic approach for quality improvement.

5.2 Structuration theory

The paper about WHAT GETS MEASURED GETS DONE relates to the problem of how a given design theory (the motivation theory of WHAT GETS MEASURED GETS DONE) is used as part of a CAS-like design approach, but is only partially successful. The failure of the principle is explained in ANT-like language.

5.3 Reflexivity

In the SYSTEMIST-paper about "using CAS for designing management systems", I talk about my own failure as some of my own people turned against me as they did not want to be measured against the same standards that we used for measuring the organization. In the same paper I mentioned that I discussed this phenomenon at a national quality conference (QUALIS-2006) only to hear that this kind of non-reflexive thinking was how all the quality people I interviewed were thinking.

However, I write an IRIS paper on IMPROVING THE IMPROVERS where I wrote about my own experience in following the self-reflective approach, arguing how this was an effective approach, and arguing that this is a good way of designing AR for doing SPI/TQM.
6 Conclusions
References
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