(Abstract) 

Motivation

This thesis presents a way of looking at the design of quality management systems through the perspective of breakthrough through breakdowns. The research is motivated by my questions I have asked by self after reflecting upon my own breakdown as a quality manager within the IT function of the Norwegian Tax Administration, finding my own experience to be a typical experience among people working with ISO 9000 or similar quality management frameworks in complex organizations.

My first contribution to the quality management discourse is to acknowledge what Nils Brunsson describes as “hypocritical organizations” not necessarily as a negative description of organizational reality but a realistic description that defines the rules of the game where the quality manager has to develop ISO 9000 strategies. Specifically, in a world dominated by clashing ontologies of nominalism (socially constructed quality management; “fake quality”) and realism (quality management from an engineering perspective; “real quality”), I suggest a viable design method must take both ontologies into account, “building real quality from fake quality” so to say.

My second contribution comes in the discussion of how the framework of complex adaptive systems (CAS) can be seen as a natural way of conceptualizing such strategies, arguing how “soft” adaptations from the “hard science” of evolutionary game theory (EGT) and genetic algorithms (GA) provide useful tools for analysing and planning with the purpose of designing quality management systems given a context of action research. Within this theoretical context I investigate the management slogan of “what gets measured gets done” as a design strategy, addressing paradoxes of control and measurement that have been made visible through the research.

My third contribution has to do with how to link the strategies from CAS with the dual nature of complex bureaucracies, trying to show how a particular line of Scandinavian IS action research, the so-called “networks of action” approach, provides an important design for producing sustainable organizational improvement. In a politically complex organization, where the quality control personnel quickly become political actors, many
quality improvement projects can be expected to fail and the whole quality management system can easily become a hot potato. Although different types of internal and external networks can prove useful for reducing the risk of total failure, a very practical approach of getting enrolled in a stable network is to align with the academic world.

In order to put the IS research within a philosophical and sociological context, the systems thinking of Niklas Luhmann has proved useful in the sense that his understanding of society suggests a useful way of linking the engineering-like aspects of how to design information systems with the phenomenological viewpoints on how they are sustained and how they break down. Further more, Luhmann’s ideas also makes it possible and perhaps also natural to apply category theory as a mathematical framework for understanding how to design quality management systems. While the mathematical structuralism of Bourbaki of the late 1930s had a major impact on sociology, psychology and systems design, Category Theory represents a newer type of mathematical structuralism that has proved useful in computer science, software engineering and social science that could also make it highly useful in information systems theory, particularly the types of problem domains addressed within this thesis.
1 Introduction

The purpose of this chapter is to motivate the research from real-life breakdown situations and explain how this naturally leads to a given research question.

1.1 Practical motivation

From 1999 to 2005, I functioned as director of quality management within the IT function of the Norwegian Tax Administration (NTAX). The systems and work processes used by NTAX are important parts of the national financial infrastructure, they are complex and NTAX has developed quality policies describing how the quality management system (QMS) is to be designed, monitored and improved through the use of quality standards, measurements, quality audits etc. shall be conducted in order to make sure that the systems are working in a predictable manner and continually improving.

Due to the complexity of the organization, this was not an easy task, but I got good feedbacks on how I chose to implement the QMS, primarily by looking at practices that were already established, documenting and assessment the current practices against standards and give feedback for management and engineers in order to make them take responsibility for the system and let them decide for themselves if and how they would like to improve the QMS. Nevertheless, it is difficult to measure, monitor and give feedback without getting critical response. In fact, during those six years, there was hardly a day without conflict, and finally I was asked to withdraw from the position.

Although I suffered a breakdown as a consequence of what happened, I did not feel that I was in a unique position. When we read the biographies of the most influential people within the quality and productivity community, people like Taylor, Deming, Juran, their lives were filled with conflicts (Kakar, 1971; xx, xx). Also, as had been my experience when going to quality management practitioner conferences, quality managers being at the centre of conflict seemed more like the norm than the exception, almost as if it was a natural part of the job if wanting to do the job properly. In order to minimize conflicts, there is literature on how to do quality audits in a friendly manner (xxx), and there is also literature within applied psychology on how to influence and resolve conflicts (xxx).
1.2 Research domain

From the body of literature seeing information systems research as a part of management research, much has been written about the role of information systems in implementing management strategies like Total Quality Management (TQM) and Business Process Reengineering (BPR). <different positions...>

When narrowing down on how to implement TQM and BPR in the software industry or within IT departments within larger organizations, similar views and positions can be found...

<here I would like to include the triangle showing how managers, workers and quality auditors represent three different views of the organization, and how these different views can produce different research questions; different positions within IS research — simplified (as I see it): positivist research aligns with management, interpretive research aligns with workers, and design science research aligns with quality auditors [i.e. QMS designers]>

Winograd and Flores (1986) argued... One position that has In the language of Heidegger (1962), the situation could be described as a breakdown situation, and perhaps a fairly typical breakdown situation in the case of quality management. In fact, if we look at the literature on the social aspects of quality management...

1.3 Research problem

The problem that has been driving my research is the problem of why breakdowns in quality management systems happen and what can be done in order to design such systems in a more resilient manner.
1.4 Overview of the thesis

This section is a reader’s guide for the thesis. Below, the ten chapters are described sequentially, giving an overview of the thesis.

How to build real quality from fake quality?
2 Literature review

<the idea is to use the Ishikawa fishbone diagram as a scientific model, thus making sure that the production of academic knowledge is aligned with the practical realities of process improvement. As I present various theories on why TQM fails and what to do in order to succeed with TQM in complex organizations, I will link the ISO 9000 clauses as I try to represent them through the Ishikawa fishbone model>

2.1 The default scientific model in quality management research

The Ishikawa fishbone model is a standard model within quality management for analysing causes of problems. In figure 1 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.

![Ishikawa Fishbone Model](image)

Figure 1. 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
2.2 Popular explanations for why TQM failure

Here I would like to produce a list or a table showing how management consultants and academics explain TQM failure. Typical causes I remember from literature are things like lack of management commitment, lack of customer focus, lack of process view, not linking TQM goals with overall strategic goals, ...

The point I want to make is that the people in charge of QMS design should perhaps try to address the points on the list, but often they have limited powers for doing so. I will then introduce the complex adaptive system (CAS) perspective on TQM, focusing more on making the QMS sustainable and resilient then making it efficient and effective. This leads to the first of my hypotheses or detailed research questions, dealing with the question of how to detailed I should then introduce ...

2.3 Lean production and quality management

Different names, such as Lean, Six Sigma, TQM etc, can either be seen as a joke as each fad is usually a rearrangement of the same ideas, or the idea about fads can be seen as a way of how key quality management methods and ideas are kept alive in social memory although they are often misunderstood, implemented wrongly, go in and out of fashion etc.

Why I mention this is because I want to show how everything boils down to one simple idea, namely “scientific management”, focusing on the scientific research carried out by Taylor and others, not on the caricatures and misapplications.

2.4 Quality management system

Design… (chapter 4 in iso 9001)

2.5 Management commitment

We get nowhere without management commitment. What do we do if there is no commitment? What do we do when we recognize that facts produced by quality personnel challenges management beliefs? (chapter 5 in iso 9001)
2.6 Resource planning

What do they do when designing information systems in developing countries where there is lack of competence, lack of motivation, lack of infrastructure..? How can these insights be used in cases like the one I discuss? (chapter 6 in iso 9001)

2.7 Product realization

Production line... (chapter 7 in iso 9001)

2.8 Measurements, analysis and improvement

Is it true that “what gets measured gets done”? Is it better not to measure? Why do we need facts? (chapter 8 in iso 9000)
3 Method

3.1 General

Rudestam & Newton (1992) suggest Action Research (AR) for investigating organizational efficiency. If we look at the foundational papers on action research, such as Lewin (1926; 1943), ...

<somewhere in the chapter I would like to introduce George Box’s explanation of research as a feedback system focusing correcting “error signals”. This is by far the best explanation of the “scientific process” that I have seen so far, and seems to fit perfectly with SPC-driven action research>

However, action research can be seen as a family of methods. Within the community of information systems, action research has been associated with interpretative research methods, such as phenomenology, hermeneutics and ethnography, sometimes described as contradictory to positivistic research. According to this classification, series of industrial experiments or semi-experiments using collecting of numerical data and statistical analysis such as hypothesis testing, does not seem to fit into the category of action research, although such designs seem to fit perfectly with what Lewin (1943) was proposing, and is, in fact, how quality management is designed (e.g. Shewhart, 1938; Moen et al, xxx).

What is missing when doing research in the style of design of experiments (DOE), at least in the style suggested by Moen et al (2006), is a political analysis.

The point of this section is to compare and contrast action research and design science research, pointing out how I have been developing my own research method, and continue to do so, based on the idea of combining AR with DSR. I will not describe this as a totally new method, but rather as an elaboration of how Lars Mathiassen and others have been developing frameworks based on action research and participatory design for
investigating problems related to software quality assurance (SQA) and software process improvement (SPI).

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 questionnaires 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

...
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

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 refreeze 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 believes 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 What gets measured gets done

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6 Conclusions
I started with the observation of a personal breakdown that I suggested was a typical breakdown situation for people working with quality management.

Although reflections upon my own case leads me to acknowledge the reason for breakdown partly being my own fault, my claim in this thesis is that the problem in question has less to do with the and more to do with the organization as a system. Complex organizations such as large bureaucracies have their own logic that may work very differently from what is expected from the organizational models used in frameworks like ISO 9000, CMMI, CobiT, ITIL, EFQM etc.

What I see as the key question for designing quality management in such organizations is the question of how to survive. This is the main question, and everything evolves from this...

Typical output from action research consists of the presentation and evaluation of a given method. In this thesis, the method in use is a method that has been designed and evaluated by myself, and although I will continue my research in elaborating, challenging and improving this method, I have chosen to present the main insights from research in terms of the boundary conditions for the method as I have explored them through the work documented here.
References


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