BRASSON - 4th perspective

with

planted

vines

\text{Bordeaux}

\text{AUS}

\text{with}

\text{nursery}

\text{vines cultivated?}
The image contains a diagram with the following text:

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I  Rotin  x  Angle 1
II  Rhin  =  1.75
III  Run  3  =
```

There are also incomplete diagrams and some crossed-out text at the bottom:

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given 1  XXX
given 2  
2        X
4        X  X  X
5        
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Finn de he vanh verkharb
TSI → TOH

SSM (Anish...)

1970
1980
PhD Status Report

General information

<table>
<thead>
<tr>
<th>Name</th>
<th>Petter Øglend</th>
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<tbody>
<tr>
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<td>Institution</td>
<td>University of Oslo / Norwegian Tax Administration</td>
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<tr>
<td>Supervisor(s)</td>
<td>Jens Kaasbøll (UiO) / Lars Bratthall (SpareBank1 Gruppen)</td>
</tr>
<tr>
<td>Stage of PhD</td>
<td>Fourth Year, First Semester (8 months left)</td>
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<tr>
<td>Title of PhD</td>
<td>Scientific management: The chemistry of organizational improvement and change</td>
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Papers

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<thead>
<tr>
<th>Title of the paper</th>
<th>Publication</th>
<th>Future</th>
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<tr>
<td>[1] Using internal benchmarking as a strategy for cultivation: A case of improving COBOL software maintenance</td>
<td>IRIS-29</td>
<td>-</td>
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<td>[2] Improving research methodology as a part of doing software process improvement</td>
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<td>?</td>
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<tr>
<td>[3] Designing quality management systems with minimal management commitment</td>
<td>Systemist, 29 (3), 101-112</td>
<td>-</td>
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<tr>
<td>[4] Software Process Improvement: What gets measured gets done</td>
<td>IRIS-31(^1)</td>
<td>SIJS (screening resulted in acceptance for resubmit with major revisions)</td>
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<tr>
<td>[5] Designing quality management systems as complex adaptive systems</td>
<td>Systemist, 30 (3), 468-491</td>
<td>-</td>
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<tr>
<td>[6] Measurements, feedback and empowerment: Critical systems theory as a foundation for software process improvement</td>
<td>ECIS-17</td>
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<tr>
<td>[7] Implementing continuous improvement through genetic algorithms</td>
<td>QMOD-12</td>
<td>Rejected by INFORMATION SCIENCES but requested for resubmit with major revisions.</td>
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<tr>
<td>[8] In search of a Giborra strategy for CMM-based software process improvement</td>
<td>IRIS-32(^2)</td>
<td>?</td>
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<td>[9] Using game theory for producing quality plans: A Pac-Man simulation experiment</td>
<td>Systemist, 31 (3), 86-103(^3)</td>
<td>-</td>
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<tr>
<td>[10] Action Research and Design Science Research – More Similar than Dissimilar</td>
<td>NOKOBIT-16</td>
<td>-</td>
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<tr>
<td>[11] The game of software process improvement: Some reflections on players, strategies and payoff</td>
<td>NOKOBIT-16</td>
<td>-</td>
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\(^1\) Best paper award  
\(^2\) Nominated for best paper award  
\(^3\) Nominated for best student paper prize at the 13th international conference of the UK Systems Society, September 2009
Research Description

**Background and motivation for your research**

If we use "scientific management" (Taylor, 1911) as the agenda for information systems research, the general problem can be seen as "how to design an optimal information systems" where the optimization criterion may be of different sorts (cost efficiency, user friendliness, customer satisfaction, technical quality etc).

As Juran (1964) points out, just like successful engineering of technical systems requires understanding of laws and principles of natural science, successful construction of organizational management systems is based on understanding and applying laws and principles from fields like sociology and psychology.

Extensive research has been carried out on identifying laws and principles of organizations and management in order to succeed with total quality management (TQM), resulting in lists of Critical Success Factors (CSF). Such lists typically stress the importance of management commitment, customer focus, skilled and educated labour, organizational culture, etc. The lists can be supplied with quantitative studies and case studies that exemplify successful organizations compliant with the CSF and organizational failure where one or several key CSF have not been present (ref).

However, many organizations may want to implement TQM without having solved the necessary CSF, but may be willing to apply an action research approach for solving the problem. The engineering problem can be stated as follows:

Construct method $X$ that will transform the organization from state $A$ to state $B$ while being optimal to the criterion $C$.

State $A$: Organization not fully compliant with CSF
State $B$: Organization evolved TQM culture (e.g. international EFQM award winner)
Criterion $C$: Cost associated with designing and running the change project

My particular interest in this kind of organizational engineering problems has to do with public sector IT organizations. Research by ref, ref, ref shows that these kind of organizations, if they are parts of a larger organization or serve other organizations, can be powerful in terms of having a monopoly of solving technical problem (being "owners" of the information system in terms of being able to destroy it) yet may also have very little internal quality and control (ref). As pointed out by Mintzberg (1983), the nature of this kind of organizations may create a culture that is opposite to what is needed for successful implementation of TQM.

**Research questions**

The overall question is whether there are cultural and behavioural patterns $Z_1, Z_2, ..., Z_n$ in the given type of organizations that can be characterized and described in a manner that will make them available to propose actions $X_1, X_2, ..., X_m$ and goals $Y_1, Y_2, ..., Y_n$ for change hypotheses of the type
In situation $Z_i$, in order to achieve $Y_p, X_k$ should be done.

Argyris & Schön (1978) argue that research about organizational change should be conducted in terms of testing hypotheses of this kind, while others argue that this approach may be too restrictive as the organizational context may not prove sufficient for proper hypothesis testing while yet useful for collecting rich and useful descriptions of change that may at later stages be used for predictions and hypothesis testing.

Research approach

**Theoretical ideas informing the research**

The reason for TQM failure is often said to be a mixture of technical and social issues, often with an emphasis on social issues (e.g. Brunsson, 2000).

Figure 1 illustrates the main actors in the TQM drama. Different researchers interpret the relationships between the actors differently. An analysis along the lines of Braverman (1974), would suggest that the scientists (change agents) aligned with the managers in order to exploit the workers. From a point of view suggested by Beer (1968), the main tension consists of scientists challenging the rationality of the managers and thus creating a conflict. From a management perspective, e.g. Sommerville (2001), the main conflict is between engineers wanting to follow their own creative path while the scientists create conflict by forcing them to comply with questionable standards.

![Figure 1: Model of the research domain ("three-player game of TQM")](image)

Due to the nature of the research questions above, the viewpoint in my thesis is the viewpoint of the scientists, trying to understand organizational culture and (of where he is self a part) and identify patterns that can be used as leverage points of designing TQM change interventions. Game theory (Rapoport, 1970) will be used as a general theory for analysing the organization, as the search for a winning strategy fits with the language of players, moves and payoff, and game theory could be an appropriate language for characterizing Brunsson’s “hypocrirical organization” (2000) as a “Nash equilibrium” in a an organizational game that needs to be redesigned.

Brunsson et al (2000) argue that the organization’s understanding of itself in a holistic manner as TQM success may equally well result in illusions about having high degree of TQM, than a TQM-based quality management system that works according to the intensions of TQM. The reason for this, they argue, is that the network of workers, managers, consultantant, quality standards organizations, TQM assessment organizations
etc., all benefit from keeping the TQM idea alive, and for the network as a whole it may be more useful to believe that they have a high level of TQM than to challenge this belief and do something about it.

**Prediction #1:** Without interventions, implementation of rational management methods (such as TQM) will not be implemented according to intentions.

Using game theory for framing the problem is based on the assumption (Gintis, 2009) that game theory can be used as a theory for the unification of the behavioural sciences. Although not specifically used in soft systems methodology (Checkland, 1981) and critical systems theory (Flood, 1992), I use elements of both traditional game theory, evolutionary game theory and “soft game theory” (i.e. drama theory) to investigate the problem domain.

In the case of developing strategies to find game equilibria, I want to apply automata theory from a similarly wide perspective, including heuristics, guidelines, methodologies etc that are not algorithms in the sense that they will run on a computer, but nevertheless sufficiently detailed that they give clear instructions or guidelines on how to implement the TQM strategy for a given organizational game-like situation.

When it comes to developing TQM strategies for dealing with socio-technical complexity of this kind, Dooley et al (1995), among others, suggests that Complex Adaptive Systems (CAS) might provide a successful approach when conditions for running the classical approach freeze-change-unfreeze are not present.

A body of literature on how to use the CAS framework for the development of organizational theory and management theory is gradually evolving (Nelson & Winter, 1982; Axelrod & Cohen, 2000). However, CAS issues are mostly used in a metaphorical sense in this literature, seldom in terms of explicit methods in the algorithmic sense. In computer science, on the other hand, CAS-concepts like Genetic Algorithms (GA) are used for developing computer software (Holland, 1988). What is largely missing is how to use something similar to GAs in order to formulate explicit methods for designing, implementing and continuously improving TQM systems.

**Prediction #2:** Viewing the game from the perspective of complex adaptive systems (CAS) makes it possible identify long-term strategies that may succeed in spite of many tactical failures.

**Empirical research strategy**

The key empirical idea is to design the quality management system (QMS) as a research instrument, thus make all interventions, monitoring and evaluation of effects as part of the daily TQM practice. As can be seen from the classical literature on scientific management and quality management (Taylor, 1911; Shewhart, 1938), the idea of seeing process improvement as organizational research was a key idea in the early days. Action research (Lewin, 1943) was not developed as an alternative to scientific management but
as a research programme within the context of scientific management (Gold, 1999).

Although my empirical research strategy has been significantly improved as I joined the PhD programme in 2006, as part of the data collection for the thesis, I will consider my total experience as a TQM practitioner in the IS industry since 1992 until the present.

Based on experience with the failure of waterfall methods and traditional TQM project management, I discovered CAS as an alternative TQM design approach in 1996. My research strategy partly consists of reflecting upon my previous work, articulating situations and strategies that resulted in success and failure. I have also continued experimental TQM on a lesser scale, using insights from personal reflections and literature studies on how to design and evaluate TQM interventions.

Consistent with general recommendations on how to do change management research, I have used an action research approach. Although there are many ways of conducting action research, I have not found an obvious match in any of the AR methods I have looked into, so I have consequently mixed ideas from different sources (Taylor 1911; Schön, 1983; Simon, 1996; Avison et al, 1999; Braa et al, 2004; McNiff & Whitehead, 2006).

Current Status

Research activities to date
As pointed out in the research description above, the overall purpose of the research is concerned with how to make TQM work in a bureaucratic setting where few of the TQM critical success factors are present.

My thesis is that organizations rendered dysfunctional from a TQM perspective can be changed into successful TQM organizations by identifying and changing non-cooperative games (win-loose/loose-win games) within the organization into cooperative games (win-win games). Through a series of scientific publications, I argue a TQM strategy based on five principles.

I. There are three mechanisms that play a central part in the strategy. First, I try to eliminate games based on bluffing by producing information through measurements and then distributing this information to all players. This mechanism is inspired by the management slogan “what gets measured gets done” (paper [4] + [11]).

II. However, building upon Schein (1987), statements like “what gets measured gets done” only works when the workers believe that the managers care about the results of the measurements. This corresponds with the critical success factor of having management commitment. As management may not always be obtainable, I introduce a bluffing game between the workers and the scientists, where the scientists try to bluff the workers into believing that the managers care about what they do. I refer to this mechanism as “fake quality “ or “faking management commitment” (paper [3] + [6]).
III. Then, as one might expect there are limits to how long the workers will be fooled into believing that managers care about quality, it is important to track down management signature practices, i.e. points in the production cycle where management signature is required, and make sure that results from controls and quality audits are handed over at the right time, when management is in a receptive mode, and make sure that the management signatures can be used for contracting improvement projects. The chase and scatter interplay between scientists and managers, I refer to as the “Pac-Man game of quality management” (paper [9]).

IV. The payoff function in games like Pac-Man consist of how long the player manages to stay alive. In order to make the TQM strategy resilient, it is necessary to run several control and improvement projects in parallel in order to have something to fall back upon each time a manager feels sufficiently threatened by the knowledge produced by the TQM process and decides to stop it. Viewing the environment from the perspective of Complex Adaptive Systems, and designing the TQM process as a Genetic Algorithm, is what I recommend in order to solve this issue (paper [1] + [5] + [7]).

V. Although the TQM programme may be designed to become resilient through CAS design, it is still dependent on the scientist in charge. As this TQM strategy consists of creating turbulence, it is necessary that the scientist belongs to a greater network of action research scientists in order to have some ex-organizational authority as a power basis if the TQM findings should happen to put powerful organizational members in a difficult situation. In addition to using the knowledge/power provided by academic network for securing data collection, data analysis and the research process in general, the network is important for publishing and discussing the results of the research in order to systematically trying to improve the current status of the strategy. I argue that the “design science action research” method implied by the original developers of scientific management, action research and TQM should be applied (paper [2] + [8] + [10]).

Future research plans
This document is supposed to meet the requirements of what I have described as “milestone zero” in my monthly status report, providing a model that put the research and different papers produced so far into a consistent whole. The next step is to discuss this document with my supervisor and my co-supervisor in order to get feedback as to whether it makes sense.

Although at the time of writing, I felt the TQM strategy based on five principles seemed like a good summary of my research contribution, I now wonder whether a strategy can be considered “scientific knowledge”. Perhaps what I have been doing is engineering rather than research, as the final product is an artifact (method, strategy) rather than an identification of some lawlike pattern of behaviour. Hmmmm... Obviously, the requirements of “milestone zero” have not been achieved yet. While the five principles say something about my “research instrument” (the QMS), it is not this system (QMS) but the environment that I am interested in (the
organizational culture). The focus of the thesis should be the patterns of organizational behaviour, and how this makes the five step strategy the “one best way” of handling it.

The next step is to rewrite and elaborate the thesis (“kappa”) by giving a more detailed account of the argument made in this document. I plan to update the kappa by working backwards, starting with the conclusion in chapter 6, then the discussion in chapter 5 and continue backwards until I reach the background and motivation in chapter 1.

I have spoken with Christina Mörtberg, and she suggests that Anita Mirijamsdottir might be a good person to have in the evaluation committee. This seems like a very good idea indeed.

If the thesis will be accepted for defense and successfully defended for the degree of PhD, my future research plan is to continue research on the TQM strategy. How this should be formalized is something that has to be addressed later. As I argue in my thesis, continued TQM strategy development through action research should be done as an integrated part of practicing some kind of TQM responsibility in an organization wanting to improve its TQM performance, meaning that further research should be carried out through a formalized collaboration between industry and academia.

Areas to be discussed

Issues/concerns related to your research

My most pressing problem is stressed in bold face in the “future research plans” section above. I feel confused about the production of knowledge in engineering (methods & models), production of knowledge in interpretative studies (metaphors & models), and the production of knowledge in natural science (lawlike behaviour giving answers to statements of the type: “Impact of CAS strategies on producing TQM culture in organizations characterized by low level of CSF compliance”).

I introduced some predictions in the section “theoretical ideas informing the research”, but I did not discuss the difference between theoretical predictions and empirical results in the section “research activities to date”. I need to reformulate both the predictions and the analysis of the empirical results until I feel that I am making a proper contribution to science. How to do this?

In my case, I feel it is the latter type of knowledge that is the only really useful for helping quality control professionals like myself dealing with organizations like NTAX. Engineering methods and cultural models are only useful as steps along the way towards this latter type of knowledge. How can I resolve this issue?

Issues/concerns related to the progress of your work or PhD in general

I balance the processes of reading, writing and empirical research by spending one day each week at NTAX for keeping the action research cycle going, two-three hours each
day reading at home, and two-three hours each day writing at UiO. I need to reassess this balance regularly in order to make sure this is the balance is optimal in terms of helping me progress with the PhD according to plan.

The milestones on the monthly status report are random. I don’t know how much work is needed and how long it will take for reaching each milestone, but the milestones are useful in giving the sequence of the final stage of the PhD and they are also useful in visualizing the progress.


