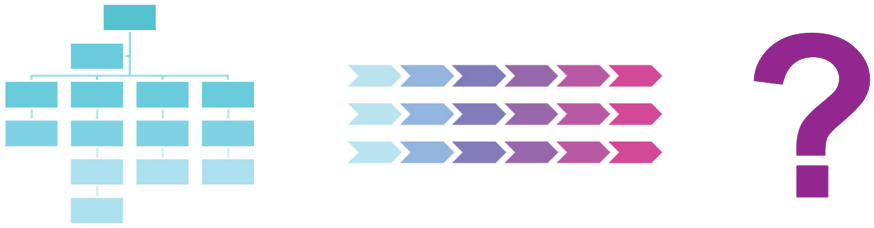
DOCTORAL THESIS

# Beyond Process Management

## *Exploring Organizational Applications and Complex Adaptive Systems*



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LULEÅ UNIVERSITY OF TECHNOLOGY

**DOCTORAL THESIS**

# BEYOND PROCESS MANAGEMENT

## Exploring Organizational Applications and Complex Adaptive Systems

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## ABSTRACT

The shift into the 21st century has been dominated by the development of information technology, affecting the way we communicate and the conditions for organizations. New forms of organizing emerge as a response to these changing conditions. Still, it seems that modern management has not changed accordingly

The purpose of the thesis is to contribute to the development of understanding and metaphors for management of the forms of organizing that is evolving as a response to changing conditions, for example an increased demand for efficiency, flexibility and innovation. The purpose is divided in two aims; (1) to explore and describe organizational implications of process management, and (2) to explore and describe the concept of complex adaptive systems from a perspective of managing organizations.

The theoretical frame of reference has been concentrated on the development of quality management, descriptions and definitions of process management and CAS as metaphors for managing organizations. Six papers are appended to the thesis, based on four case studies and a literature review. The seven organizations in Study 1 had in a previous study claimed they were actively working with process management. The selection in Study 2 was made of three organizations that were successful in their quality efforts. The two last case studies explore successful, deviating organizations; Agria Pet Insurance in Study 3, two-time recipient of the Swedish Quality Award ; and the education system of Nacka municipality, in Study 6, who have received several instances of national recognition of their results.

The conclusions include that there are currently no widespread and well established definitions of process management, but two different movements have been identified and described. The transformation from a functionally-oriented to a process-oriented organization is described as resulting in a matrix structure with both a functional and process perspective, creating constructive dynamics. An implication of the results is that organizational complexity is often increased rather than reduced when introducing process management.

The possibilities of using knowledge of complex adaptive systems (CAS) to develop metaphors for managing organizations are presented and discussed. Properties of and approaches for managing organizations as CAS are identified and described. Finally, a tentative conceptual model for managing organizations as CAS is presented.

## SAMMANFATTNING

Början av 2000-talet har i många avseenden påverkats av utvecklingen av informationsteknologi som i sin tur har påverkat hur vi kommunicerar och förutsättningarna för organisationer. Nya former av organisering utvecklas för att möta de förändrade förutsättningarna. Motsvarande förändringar verkar dock inte ha skett när det gäller hur organisationer leds och styrs.

Syftet med avhandlingen är att bidra till utvecklingen av förståelse och metaforer för ledning och styrning av de former för organisering som utvecklas som ett svar på förändringar vad gäller bl.a. ökade krav på effektivitet, flexibilitet och innovation. Syftet har preciserats i form av två mål: (1) att utforska och beskriva organisatoriska implikationer av processledning, och (2) att utforska och beskriva komplexa adaptiva system utifrån ett perspektiv av organisatorisk ledning och styrning.

Den teoretiska referensramen har koncentrerats till tre områden: utvecklingen av kvalitetsledning, beskrivningar och definitioner av processledning, samt komplexa adaptiva system som metaforer för att leda och styra organisationer. Sex artiklar är bilagda till avhandlingen, vilka bygger på fyra fallstudier och en litteraturstudie. Den första studien utforskar sju organisationer som i tidigare studier uppgett att de aktivt arbetade med processledning. Den andra studien baseras på tre organisationer som varit framgångsrika i sitt kvalitetsarbete. De två sista fallstudierna utforskar organisationer valda utifrån att de varit framgångsrika exempel: studie tre beskriver Agria Djurförsäkring, mottagare av Utmärkelsen Svensk Kvalitet två gånger, och skolsystemet i Nacka kommun som fått flera nationella utmärkelser för sina resultat beskrivs i studie sex.

En slutsats är att det för närvarande inte finns några utbredda och etablerade definitioner av processledning, däremot har två olika grupperingar identifierats. Övergången från funktions- till processorienterad organisation beskrivs resultera i en matrisstruktur som omfattar både ett funktionellt orienterat och processorienterat perspektiv på verksamheten, något som skapar en konstruktiv dynamik. En implikation av resultaten är att komplexiteten i organisationen ökar när man inför processledning.

Möjligheter att använda kunskapen kring komplexa adaptiva system (KAS) för att utveckla metaforer för ledning och styrning av organisationer presenteras och diskuteras. Egenskaper hos KAS, liksom angreppssätt för att leda och styra organisationer som KAS, identifieras och beskrivs. Slutligen presenteras en tentativ, konceptuell modell för att leda och styra organisationer som KAS.

## ACKNOWLEDGEMENTS

There are a number of people who have contributed in making this research possible. First of all I would like to thank my supervisor Rickard Garvare for your all support and for believing in me, I admire you for your knowledge and patience. I would also like to thank my assistant supervisor Mattias Elg for your critical comments, feedback and support. Further, I would like to thank Bengt Klefsjö for hiring me at the Division of Quality Management as a first-year student, encouraging my interest in quality management and research, and sharing your experience with me. During the last year I have received a lot of useful feedback from Evert Gummesson regarding my two last papers, thank you.

This work would not been possible without the participating organizations. Special appreciation goes to Agria Pet Insurances for financing the research to my licentiate degree. At Agria I would like to thank Ann Horn, Anders Mellberg and Mattias Wallman for intense and interesting discussions. I would also thank Lena Dahlstedt at Nacka municipality for allowing me to explore the management system of the education system. I would like to express my gratitude to all the interviewees in the four case studies.

I would like to thank former colleagues at the Division of Quality management at Luleå University of Technology; Peter Johansson, Raine Isaksson, Erik Vanhatalo, Björn Kvarnström, Jonas Hansson and Henrik Eriksson for feedback and interesting discussions during the years, and Jacob Hallencreutz for our research lunches in Stockholm.

My number one supporter in this work has been my mother and my fantastic colleague in Mementor Ledarskap AB Margareta Palmberg. She has introduced me to systems thinking and complexity, and has supported and inspired me throughout this work. Finally, I would like to thank the rest of my family; Andreas, Lisa, Lasse, Benjamin and Caspar, and my friends for your love, support, and encouragement.

Stockholm, May 2009

Klara Palmberg

# PREFACE

*The objective of this preface is to describe the journey towards the results presented in this thesis. By describing my experience relevant to this work I hope it will be possible for you as a reader to understand more about the person behind the research and the lens through which I am looking at the world.*

One might say that my interest in quality management started when I, in 1999, worked as a production assistant at the video production firm documenting the recipients of the Swedish quality award. The following year I started my studies at Luleå University of Technology (LTU) in Industrial Engineering and Management. During the time of my studies I worked as an assistant research fellow (amanuens, in Swedish) at the Division of Quality Management working with several PhD students (Rickard Garvare, Jonas Hansson and Henrik Eriksson) in their fieldwork, transcribing interviews, and documenting survey answers. This is how I learned to know Rickard who has been my supervisor.

In Study 2 Agria Pet Insurances was one if the participating organizations and the following summer, 2003, I did my master thesis work about Agria's improvement efforts. I got my master degree in 2004 and started directly as a PhD student at the Division of Quality Management, financed by Agria. During my licentiate work I commuted between LTU and Agria in Stockholm, between the academic world and action research in developing the process management work at Agria, resulting in Paper 3. During this time I also had the opportunity to participate as an assessor in the Swedish Quality Award.

After receiving my licentiate degree in the winter 2005/2006 I started working as a management consultant at PA Consulting Group in Stockholm, and in late 2007 I started working in Mementor Ledarskap, the consultancy firm that my mother had started earlier. The work of performing the research and writing this doctorial thesis the last two years has been performed in parallel with, and financed through, my work in Mementor Ledarskap. The management consultancy work has allowed me to get hands on experience from driving process management initiatives in several organizations.

The five years as a PhD student have been full of intense learning and I hope that I have been able to put some of my experience in writing here for you to read.

# CONTENT

## APPENDED PAPERS

# 1 INTRODUCTION

*This chapter presents the background to the research, and the purpose and research questions of this thesis. Finally, the structure of the thesis is described.*

## 1.1 Background

### Organizational consequences of information technology development

During the 20th century, the development of production technology fundamentally influenced society and the logic of business and organizations. In a similar way, the 21st century has been dominated by the development of information technology, affecting the way we communicate and the conditions for organizations, businesses and the production of goods and services. Consequences of the development of information technology include:

- *Interconnectedness* – larger parts of the world are connected by flows of information, money and products. A collaboration which gives rise to a global economy that demands and enables new kinds of economic cooperation.
- *Transparency* – new technology creates new possibilities for sharing information and we now have access to unprecedented amounts of information. Tapscott and Williams (2006, p. 22) state that "transparency is critical to business partnership, lowering the transaction cost between firms and speeding up the metabolism of business webs".
- *Decreased cost of information* – the price of processing, storing and transmitting information has declined each year, resulting in prices incomparable to the pre-Internet era. Among other things, customer loyalty has been a product of limited information and the cost and effort of searching for information (Hamel, 2007).
- *Empowerment of individuals* – the decreasing cost of and accelerating access to information made available by new technology has resulted in an openness that gives individuals enhanced control and power (Hamel, 2007). Employees and customers participate in the economy like never before, changing how goods and services are invented, produced, marketed and distributed (Tapscott & Williams, 2006).
- *Increasing speed of transactions, change and life cycles* – the time spans of both the production cycle (Sandberg & Targama, 2007) and strategic cycles (Hamel, 2007) are becoming shorter. Research by Thomas and D'Aveni (2004) shows that business leaders are replaced much more often nowadays and competitive

advantages disappear faster than ever before (in Hamel, 2007). The IBM Global CEO Study (IBM, 2008), where 1130 CEOs worldwide were asked about their views on the future, shows that the gap between organizations' need to drive change and their ability to drive change successfully tripled between 2006 and 2008.

### New forms of organizing emerge as a response to changing conditions

The above mentioned consequences of the development of information technology require organizations to be responsive and able to combine efficiency with flexibility and innovation (Cohen, 1999; Hamel, 2007; Sandberg & Targama, 2007). To respond to the demand for flexibility, we have become more familiar with forms of organizing established and dissolved for single assignments (Cohen, 1999). Tapscott and Williams (2006) highlight the need for continuous reorganization to maintain or gain competitive advantage.

Today, many products and services are invented and produced by networks of agents, where much of the value is created outside the traditional hierarchical organization. The ability to use both external and internal resources to solve tasks has become more important. Pisano and Verganti (2008, p. 78) argue that "no company should innovate on their own". Services such as Alibaba (an online trading platform allowing buyers and suppliers from small companies worldwide to connect) allow agents to cooperate when needed, without being tied to each other. Concepts such as user contribution, peer production and mass collaboration, where products or services are delivered with little or no intervention by the company, are revolutionizing the economics of entire industries, illustrated, for instance, by eBay, Wikipedia, Skype and Google (Cook, 2008).

Organizations are increasingly involved in value networks and business ecosystems of which they have limited control (Hamel, 2007) and to hand over significant power to people outside the company could be a significant challenge to many managers. New forms of organizing challenge the role of management, the value of experts, the need for control over customer experience and the importance of quality assurance (Cook, 2008).

The expression *new forms of organizing* is used in the thesis as: networks of agents where value is created without using the traditional form of organization, but by means of both internal and external resources, for example, value networks, mass collaboration, user contribution and peer production. This is a contrast to *traditional organizations*: organizations managed vertically and hierarchically with a division of

power between functional units. The term *organization* includes entities within the span from traditional organizations to new forms of organizing.

The properties of the new forms of organizing include: *interdependency* between agents, *co-evolution* where organizations act and react in cooperation and in competition with others, *self-organization* as a self-enhancing process that aims to construct and retain current structures, *emergence* that is the creation of attributes, structures, and capabilities that are not inherent to any single node in the network and the property of *distributed control* that is opposite to a hierarchical central authority, directing all agents.

### Few visible changes in modern management have emerged despite these new forms of organizing

Even though the forms of organizing have evolved considerably in recent years, several authors find that many of the existing principles for management have not changed accordingly (Hamel, 2007, 2009). The term *management* is said to have its roots from: Manu agere (Latin) – to lead by hand; Maneggiare (Italian) – to handle, especially a horse; Ménagement (old French) – the art of conducting, directing. In this thesis it is defined as the leading, directing and coordination of an organization.

The principles of modern management, resting on ideas developed by, among others, Fayol (1980), Taylor (1911) and Weber (1947), could be described as: *stability as the objective* – maintaining control, predictability and efficiency, *analysis by reduction* – with an ideal from the 20th century natural sciences, the approach to problem-solving has been based on the principle of breaking down objects into smaller parts, and finally to find *cause and effect mechanisms between the parts*. It is argued that we have spent so much time teaching our organizations to be systematized and orderly that now they cannot respond to the fast-changing environment (Tetenbaum, 1998). Tapscott and Williams (2006, p. 31) argue that "the old hierarchical ways of organizing work innovation do not afford the same level of agility, creativity and connectivity that companies require to remain competitive in today's environment".

We are formed and limited by our images, language, metaphors and mental models, and these affect our understanding of the world and how we take action (Senge, 1990; Zimmerman et al., 1998; Gharajedaghi, 1999). To think of something requires an image or a concept of it (Gharajedaghi, 1999) and it is also hard to imagine something for which we lack the words to describe (Hamel, 2007). Kuhn (1962) claimed that you don't see something until you have the right metaphor to let you perceive it.

> We need images to think. (Aristotle cited in Wheeler and Long, 2007, p. 13)

Morgan (2006) argues that the use of metaphors implies a way of thinking and a way of seeing that pervade how we understand the world generally, and that all theories of organizations lead us to see, understand and manage organizations. Cornelissen and Kafouros (2008) claim that metaphors have a constitutive role in organization theory, rather than just being decorative or figures of speech.

Almost 20 years ago, Senge (1990) described how managers have a language designed for solving simple, static problems when facing the challenges of the current business environment of complex, dynamic realities. Still, a dominating mental model of an organization is the hierarchical scheme seen in Figure 1.1. There is a lack of metaphors and illustrations for organizational forms such as value networks, mass collaboration, multi-unit enterprises and user contribution systems.

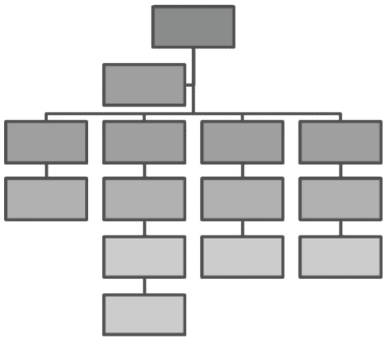


**Figure 1.1 – The dominating mental model for organizations; a hierarchical chart managed vertically with a division of power between functional units.**

## There is a need for development of management research

Increased complexity creates a challenge for leaders in organizations and value networks to make the network accomplish more value than any agent could acting alone. To face these challenges, Sandberg and Targama (2007) argue that the collection of methodologies of management needs to be developed.

In a debate article in the Swedish business press, the Director General of Vinnova (the Swedish Governmental Agency for Innovation Systems) together with the former chairman of Unionen, a Swedish trade union, argue that knowledge about successful practical management is crucial for organizations today. They call for research on how growth and success can be created through leadership and management and how organizational prerequisites can be created for innovation, efficiency and competitiveness. Further, they claim that existing management research has not kept up with the new demands of our time (Eriksson and Kranzt, 2008).

### Processes and complexity – possible metaphors for organizations?

Traditionally, organizations have often been managed vertically and hierarchically with a division of power between functional units. This could lead to ineffective addressing of many cross-functional issues and thereby sub-optimization of the organization. There are several suggestions of management ideas and metaphors for organizations as alternatives to the hierarchical organization in Figure 1.1. For example, Morgan (2006) describes the metaphors of organizations as machines, organisms, brains, cultures and political systems. The management ideas and metaphors for organizations investigated in this thesis are process management and complex adaptive systems (CAS).

By using horizontal process management the organization is viewed as a network of processes linked across the organization (Figure 1.2). Processes and process management are becoming an essential part of contemporary organizations in most industries. Quality management, six sigma and lean all build on components of working with and improving organizational processes (Andersson et al., 2006; Dahlgaard & Dahlgaard-Park, 2006). The new ISO 9001:2008 standard places considerable emphasis on processes (ISO, 2009) and process management is a significant part of most excellence models, such as the Malcolm Balridge National Quality Award (NIST, 2009) and the EFQM Excellence Model (EFQM, 2009). When exploring whether six sigma and lean are new methods or repackaged versions of previously popular methods – for instance total quality management and just-in-time – Näslund (2008) emphasizes the importance of placing organizational change and improvement methods in general under a process management umbrella.

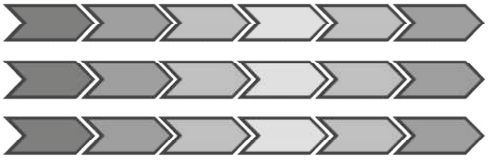


**Figure 1.2 – An illustration of processes running through an organization, often labeled as a process map.**

Based on a literature review, Zairi (1997) stated that the word ‘process’ had become a part of everyday business language. Hammer and Stanton (1999) argued, on the basis of a study of IBM and Microsoft among others, that for most companies there is no real alternative to shifting from a traditional business to a process enterprise. Organizations in Sweden have been working explicitly with process management since the end of the 1980s. The methodology has been used to reduce lead times and increase customer focus both inside and outside the organization, and this

development has been attributed to escalating demands from customers regarding quality (Egnell, 1994).

Even though process management is a common approach today, many organizations express concerns about problems with implementing and maintaining a process management approach. In a study of quality award recipients in Sweden, Hansson (2003) found that many small organizations perceive work with process management to be problematic. Based on a survey of the application of process management in Swedish organizations, Forsberg et al. (1999) state that the expectations for results are unreasonably high. Rentzhog (1996) concludes that process management seems difficult to understand and put into action.

Numerous process definitions have been proposed through the years, most of them fairly similar. Still, there are many disparate views among practitioners regarding the concept of processes and process management (Armistead et al., 1999; Belmiro et al., 2000; Isaksson, 2006). Furthermore, when it comes to process management, the notions and definitions used vary widely (Garvin, 1995; Armistead & Machin, 1997; Pritchard & Armistead, 1999; Ljungberg, 2002; Biazzo & Bernardi, 2003; Hellström & Eriksson, 2007). In addition, the approaches and tools suggested for process management vary both in the literature and in practice and give few clear-cut directions on how to deploy process management (Hellström & Eriksson, 2007).

Hellström and Peterson (2005) conclude that the literature is foremost built on theoretical reasoning, resulting in a large number of how-to-do checklists. They argue that there is a lack of empirical research into the effects of process management, stating that "despite a decade of experience of practicing process-oriented management, certain fundamental problems still beset its successful application and causes practitioners concern". Based on a literature review, O'Neill and Sohal (1999) reach the same conclusion and state that more empirical research is needed.

Analysis of organizations implementing process management shows that functional and process structures often co-exist, creating a dynamic matrix in the organization, presented in the appended Paper 2. Organizational complexity is increased rather than reduced in order to handle several parallel perspectives on the business. One can also argue that the development of increased interconnectedness, transparency, empowerment of individuals, speed of transactions, and decreased cost of information also contributes to the challenge of complexity.

How to manage complexity instead of reducing it is a challenge for the management of contemporary organizations. There are several authors arguing for the possibilities of applying ideas of complex adaptive systems (CAS) to managing organizations

(Lissack, 1999). A CAS is defined as a set of interdependent agents forming an integrated whole, where an agent may be a person or an organization.

## 1.2 Purpose and research questions

The purpose of the thesis is to contribute to the development of understanding and metaphors for management of the forms of organizing that is evolving as a response to changing conditions, for example an increased demand for efficiency, flexibility and innovation. As described above the management ideas and metaphors for organizations investigated in this thesis are process management and CAS.

The purpose is divided into two aims that have been further broken down into research questions:

*To explore and describe organizational implications of process management:*

- Are there any widespread models and definitions of process management?
- What are the drivers for and organizational effects of implementing process management?
- What can a transition from a functionally-oriented to a process-oriented organization look like?

*To explore and describe the concept of CAS from the perspective of managing organizations:*

- What are the properties of CAS and are there readily available approaches for managing organizations as CAS?
- How can the concept of CAS be used to develop metaphors, models and approaches for managing new forms of organizations?

## 1.3 Structure of the thesis

Chapter 2 aims to provide a context and theoretical framework for the research presented in this thesis. It is followed by a chapter on methodology, where the research approach and paradigm in which the research has been conducted is presented, and the research strategy is presented and discussed. In the summary of appended papers presented in the following chapter, the background and purpose, the methodology used and the findings and conclusions of each of the six appended papers is presented. Finally, conclusions are drawn in Chapter 5 and a discussion is held on the presented results and further research in Chapter 6.

The six appended papers are based on six different studies:

- **Study 1** – Multiple case study of experiences when introducing process management in seven organizations, during 2002, presented in:
- **Paper 1** – *Case studies of Process Management in Small and Medium Sized Enterprises*, Garvare, R. & Palmberg, K.

- **Study 2** – Multiple case study of experiences of implementing process management in three organizations during 2003, presented in:
- **Paper 2** – *Experiences of implementing process management: a multiple-case study*, Palmberg, K. Accepted to Business Process Management Journal, May 2009. Earlier version presented at and published in proceedings from the 8th QMOD Conference, Palermo, Italy, June 29 – July 1, 2005.

- **Study 3** – Action research at Agria Pet Insurance on development of process management approaches and structures for improvement during 2003–2005, presented in:
- **Paper 3** – *Sustained quality management: how to receive the Swedish quality award twice*, Palmberg, K. & Garvare, R. International Journal of Quality & Reliability Management, 2006, Vol. 23, No. 1, pp. 42–59.

- **Study 4** – Literature review on process management performed during 2008, presented in:
- **Paper 4** – *Exploring process management: are there any widespread models and definitions?* Palmberg, K. The TQM Journal, 2009, Vol. 21, No. 2, pp. 203–215.

- **Study 5** – Methodological discussion as a result from the PhD course Interactive research, autumn 2008, Jönköping Sweden, presented in:
- **Paper 5** – *An alternative case study approach in management research*, Palmberg, K. to be published in Vägval och dilemman in interaktiv forskning [Crossroads and Dilemmas in Interactive research, in Swedish], Elg M. & Andersson Gäre, B. (eds), Linköping University.

- **Study 6** – A combination of literature studies of CAS and a case study of the management principles of the education system of Nacka municipality during 2008–2009, presented in:
- **Paper 6** – C*omplex adaptive systems as metaphors for organizational management*, Palmberg, K. Accepted with revisions to The Learning Organization, May 2009.

# 2 FRAME OF REFERENCE

*The frame of reference aims to provide a context and theoretical framework for the research presented in this thesis. The chapter consists of three parts: quality management, process management and complex adaptive systems.*

## 2.1 Quality management

Quality management concepts, such as total quality management (TQM), have been the subject of discussion among management academics for several years. There have been many reports of a positive relationship between the adoption of TQM and improved performance of organizations, see, for instance, Easton and Jarrel (1998), Hendricks and Singhal (1997) and Reed et al. (2000).

However, despite the enthusiasm for TQM among a large number of organizations, efforts of implementation have often faced difficulties. Many have tried to implement these concepts, but not all have succeeded, see, for instance, Dale et al. (1997), Edwards and Sohal (2003), Garvare (2002), and Haupt and Whiteman (2004). Beer (2003) is one of those who argue that TQM programs often fail to create deep and sustained change in organizations. He claims that the implementation of the technical methods and principles of TQM requires a quality of management – managerial values, attitudes, skills and behavior.

### The development of quality management

The evolution of quality movement could be portrayed in many ways. One common description is based on a single-path assumption consisting of four major steps: quality inspection, quality control, quality assurance and total quality management (TQM), see for instance, Bergman and Klefsjö (2003), Dale (1999), Garvin (1988) and Sandholm (2000).

Kroslid (1999) introduced a dual-path assumption describing two parallel schools, the deterministic and continuous improvement schools of thought. The deterministic school comprises the quality assurance standards movement and is generally characterized by Taylorism[1], standard development (i.e. ISO 9000) and the principle of zero defects. The continuous improvement school comprises the advocates of quality awards, such as the Malcolm Balridge National Quality Award, and is founded on the principle of variation and seeking improvement potential in every aspect of work. According to Kroslid (1999), the two schools have coexisted for

[1] Frederick W. Taylor, the father of Scientific Management, see Taylor (1911).

many years. Bergman and Klefsjö (2003) argue that the schools have been approaching each other regarding their views on quality management in recent times.

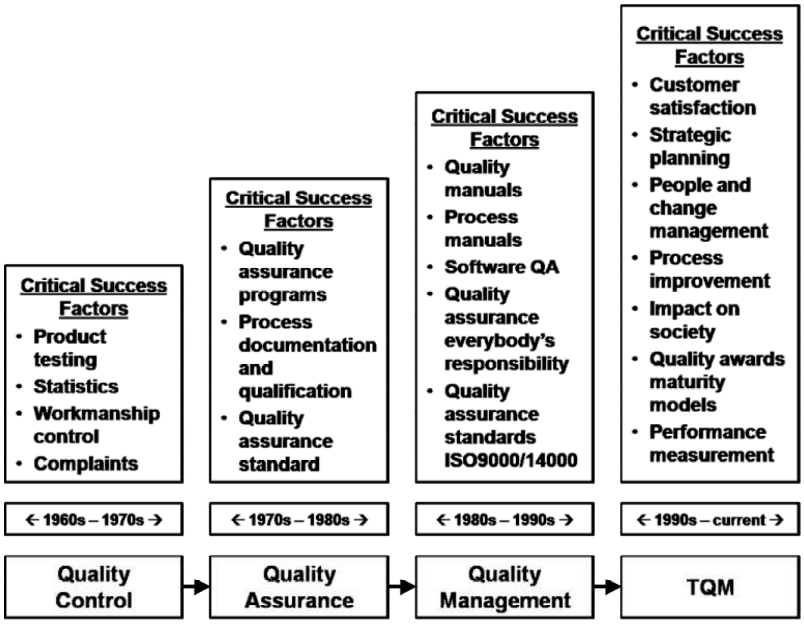



**Figure 2.1 – The evolution from quality control to TQM, according to Zairi (2002)**

A variation of the single-path assumption is presented by Zairi (2002), (Figure 2.1). This description focuses on the critical success factors (methodologies and tools as some would call them) which have been the center of attention during different stages of the quality movement evolution. It also differentiates between quality management and TQM.

As seen in the different descriptions of the development of quality management, TQM is viewed by many authors as the latest stage of the evolution, even though they do not agree on how it has evolved. Recently, the increased interest in lean and six sigma has caused discussions on their similarities and differences to TQM, see, for instance, Andersson et al. (2006) and Dahlgaard and Dahlgaard-Park (2006).

### TQM as a set of values, methodologies and tools

Zairi (2002, p. 1169) states that "TQM looks at quality as a long-term business strategy, which strives to provide products and/or services to satisfy fully both internal and external customers by meeting their explicit and implicit expectations". According to Bergman and Klefsjö (2003), "TQM is a constant endeavor to fulfill, and preferably exceed, customers' needs and expectations at the lowest cost, by continuous improvement work, to which all involved are committed, focusing on the

processes in the organization." Hellsten and Klefsjö (2000) define TQM as "a continuously evolving management system consisting of values, techniques and tools with the aim of increasing external and internal customer satisfaction with a reduced amount of resources" (Figure 2.2).

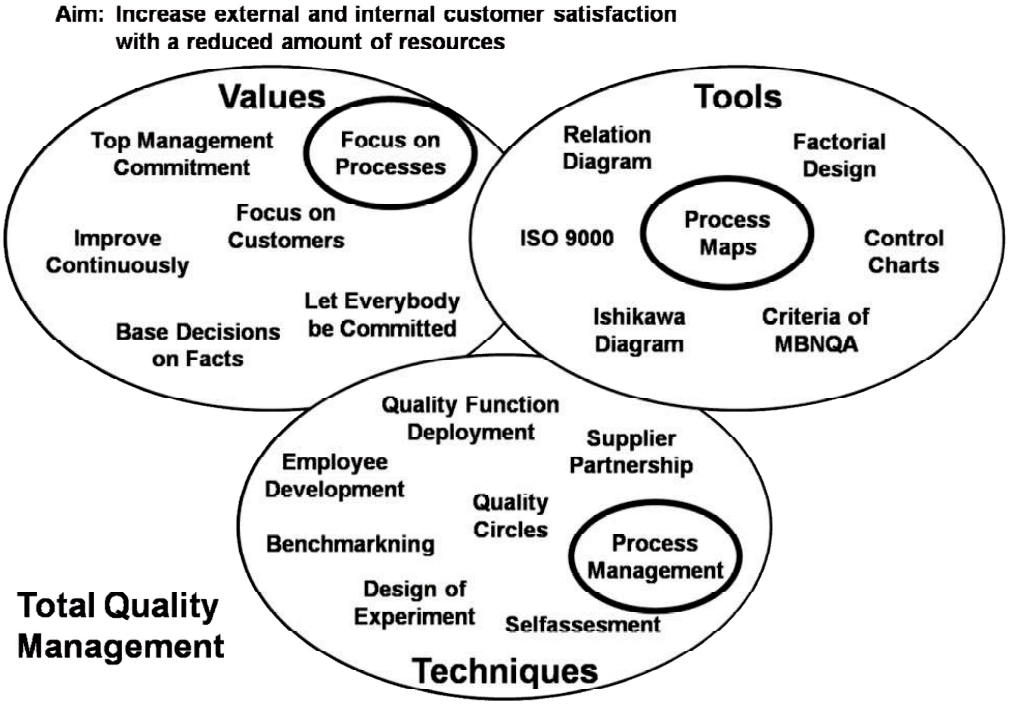



**Figure 2.2 - The system of TQM consisting of values, techniques and tools (Hellsten & Klefsjö, 2000). The circles highlighting the areas of processes are added by the author and will be discussed in Section 2.2.**

Central to all these definitions is the focus on customer satisfaction. Hellsten and Klefsjö (2000) add to this the three categories of "values, techniques and tools". The term *values* refers to "the guiding principles and/or behaviors that embody how your organization and its people are expected to operate" (NIST, 2003). The values referred to by Hellsten and Klefsjö (2000) form a set of principles, which could be viewed as the basis for TQM.

*Techniques* is a term used to describe the "ways to work within the organization to reach these values" (Hellsten & Klefsjö, 2000). The term *techniques* was later changed by Hellsten and Klefsjö, who now prefer to call it *methodologies*. The term methodologies will be used in this thesis. *Tools* refers to those "rather concrete and well-defined tools, which sometimes have a statistical basis, to support decision-making or facilitate analysis of data" (Hellsten & Klefsjö, 2000).

Many authors have discussed the values of TQM. Hellsten (1997) concludes that the correspondence between the sets of values presented by most authors is fairly high. A comparison of values of different frameworks for TQM has been presented by Rahman (2004). The values mentioned there are consistent with the core values of different quality awards such as the Malcolm Balridge National Quality Award, the European Quality Award or the Swedish Quality Award, see, for instance, Hellsten and Klefsjö (2000). There is also strong agreement between the values described by Rahman (2004) and the principles of ISO 9000:2000, see, for example, Isaksson (2004).

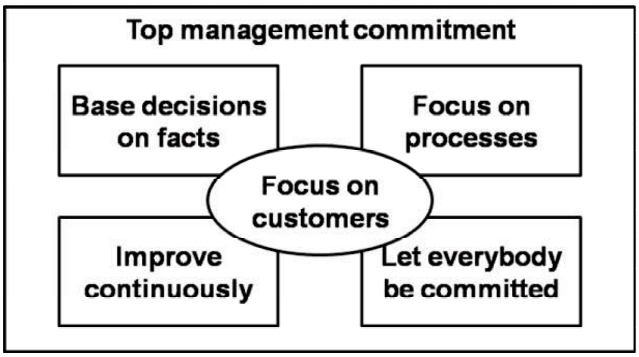



**Figure 2.3 – The values of TQM, according to Bergman and Klefsjö (2003).**

### Values as elements of TQM

In Figure 2.3 the values of TQM are displayed according to a model developed by Bergman and Klefsjö (2003), note the connection to the values of Figure 2.2. Values of TQM are further discussed in, for example, Kennerfalk (1995), Hellsten (1997), Sila and Ebrahimpour (2002), Eriksson (2003), Bergman and Klefsjö (2003), Isaksson (2004) and Foley et al. (2005).

### Excellence awards

As stated by Eriksson (2003), a common proxy for a successful implementation of TQM is the reception of a quality award. Findings from several case studies indicate that if the goal is lasting results, it is insufficient to participate in a quality award process only once. Instead one should participate in the process several times, with enough time in between the applications in order to complete as many as possible of the improvement projects resulting from the evaluations (Eriksson and Garvare, 2005); see also appended Paper 3.

The Swedish Quality Award is based on the Swedish Institute for Quality's (SIQ) model for customer-oriented organizational development. The model is based on four steps (SIQ, 2004):

- How do you go about …?
- To what extent do you apply what you do?
- What is the result?
- How do you evaluate and improve what you do?

The four questions are the basis for the battery of questions that the organizations participating in the evaluation of the award answer. The questions are asked within the criteria of leadership, information and analysis, strategic planning, employee development, processes, result and customer satisfaction.

The European Quality award is managed by the European Foundation for Quality Management (EFQM). The European award in based on the RADAR-logic:

- Results – determine the results you are aiming for
- Approach – plan and develop approaches to deliver the required results
- Deployment – deploy the approaches in a systematic way
- Assessment – Assess and review the approaches followed based on monitoring and analyzing the results achieved.
- Review (EFQM, 2009)

The logic is used in nine criteria: leadership, people, policy and strategy, partnership and resources, processes, people results, customer results, society results and key performance results. The EFQM emphasizes the results of the quality initiatives. The use of the RADAR-logic stresses the organization to state what they want to achieve from the start, before choosing an approach or tools. The SIQ model starts off directly in the approach and tools by asking "how" before considering "why".

## 2.2 Process management

The concept of process management is not new. Shewhart (1931) was one of the first to argue for process control in favor of product control. During the 1970s, methodologies for working with processes were developed under labels such as just-in-time and lean production (Schonberger, 1986). In the 1980s and 1990s, the scope of process control was expanded to encompass a corporate emphasis, including all functions of an organization. A great deal of attention was focused on business process re-engineering (BPR), as described by, for example, Hammer and Champy (1993). Process management has been on the agenda since the early 1980s, but unlike many other management concepts, interest in process management has remained high (Hellström, 2006). The next sextions are further developed in Paper 4 and in the research report Palmberg (2008).

## Process definitions, categorizations and roles

Numerous process definitions have been proposed through the years, most of them fairly similar. Still, there many disparate views among practitioners regarding the concept of processes and process management (Armistead et al., 1999; Belmiro et al., 2000; Isaksson, 2006).

Almost all the studied authors define "process" in their own words. There is no single definition which stands out as the most widely used. The differences found between the identified definitions have been reduced to six components that can be seen in the majority of definitions (see also appended Paper 4): *input and output, interrelated activities, horizontal: intra-functional or cross-functional; purpose or value for customer, the use of resource, and repeatability.*

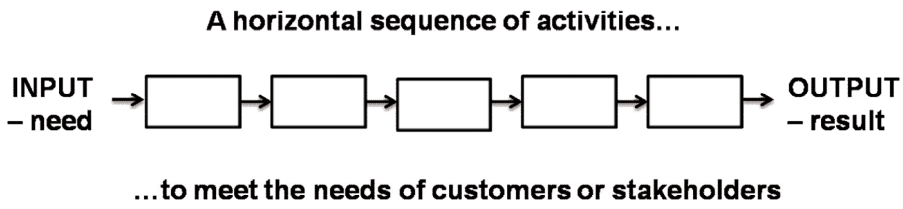



**Figure 2.4 – A net process definition: A horizontal sequence of activities that transforms an input (need) to an output (result) to meet the needs of customers or stakeholders.**

A net process definition can be condensed to "*a horizontal sequence of activities that transforms an input (need) to an output (result) to meet the needs of customers or stakeholders*" (see Figure 2.4).

In the articles reviewed, both categories of processes and hierarchies within processes are described (Figure 2.5). The analysis of the reviewed articles has identified three general process categories (see also Paper 4): *strategic management processes, operational delivery processes and supportive administrative processes.*

In a similar way the levels or hierarchy of processes described in the reviewed articles have been summarized into four categories: *process, sub-process, activities and tasks*, see also Harrington (1991), Walsh (1995), DeToro and McCabe (1997) and Lillrank and Liukko (2004).

There are two process roles described in the reviewed articles. The role of the *process owners* is described as accountable for all process improvement results with authority to approve process changes (DeToro & McCabe, 1997), responsible for optimizing efficiency and effectiveness, ensuring that external customer requirements are met (DeToro & McCabe, 1997) and overseeing performance control and continuous improvement (Biazzo & Bernardi, 2003).

The other role described in the literature is the one of the *member in cross-functional process teams*, see DeToro and McCabe (1997), Lee and Dale (1998) and McAdam and McCormack (2001). Their role is portrayed by DeToro and McCabe (1997, p. 58) as follows: "to map and document the process, assess performance, analyze deficiencies, select an improvement strategy, propose design changes, implement fixes and assess results." The process teams are also described as supporting employee empowerment.

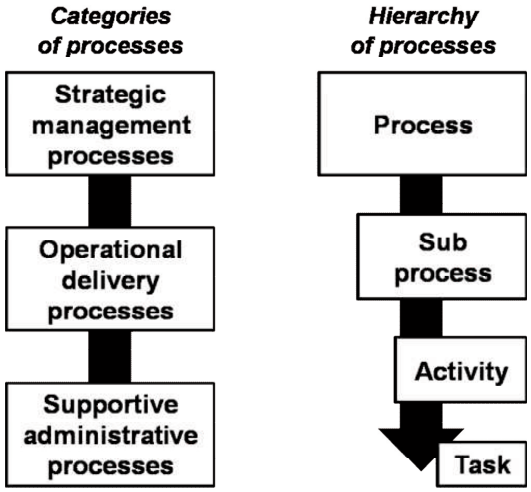



**Figure 2.5 - Two ways to categorize processes.**

## Definitions of process management

When it comes to managing the processes on a organizational level, the notions and definitions of process management used vary widely, see Garvin (1995), Armistead and Machin (1997), Pritchard and Armistead (1999), Ljungberg (2002), Biazzo and Bernardi (2003), and Hellström and Eriksson (2007). The literature study of definitions of process management gave a large amount of material which was further categorized into a second level of labels.

### *What is process management?*

Very few of the studied authors provide a comprehensive answer to the fundamental question of what process management really is, see Paper 4. It appears the answer is implicit but widely agreed upon. Still, there seems to be differences in what the authors consider process management to be. Analysis reveals two distinctly different movements: *process management for single process improvement* and *process management for system management* (Figure 2.6).

The first movement, focusing on the management and improvement of single processes, can be summarized into statement *(A): "A structured systematic approach to analyze and continually improve the process."* This view is shared by Elzinga et al. (1995), Zairi (1997), Lee and Dale (1998) and Biazzo and Bernardi (2003).

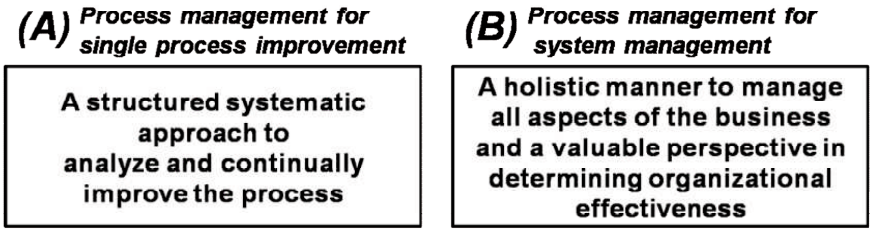



**Figure 2.6 – Two different movements in what the authors consider process management to be.**

A holistic view on process management as a part of managing the whole organization is supported by Lee and Dale (1998), McAdam and McCormack (2001) and Bawden and Zuber-Skerritt (2002). This is described by Pritchard and Armistead (1999, p. 22) as *"a more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness"*.

Lee and Dale (1998, p. 218) somewhat summarize the two views above as follows: "Business Process Management is both a set of tools and techniques for improving processes and a method for integrating the whole organization and it needs to be understood by all employees."

### Approaches and tools for process management

The approaches and tools suggested for process management vary both in the literature and in practice (Hellström & Eriksson, 2007). Many authors have combined tools and techniques into methodologies and checklists that are of a consulting character; in this section these are labelled approaches for process management, i.e. a step-by-step guide for working with process management. The analysis of the material shows a divergence of what process management is in line with the two different movements (A) and (B) (Figure 2.6).

The methodology corresponding to the first definition – process management as a structured systematic approach to analyze and continually improve the process – can be summarized as:

1. *Process selection*
2. *Process description and mapping*
3. *Organizing for quality*

4. *Process measurements and quantifications*
5. *Process improvements*

Lock Lee (2005) presents a methodology that is focused on the design and implementation of software products supporting business processes. This is in line with definition (A) of process management, but with a strong focus on the purpose of identifying opportunities for outsourcing and use of technology to support business suggested by Lock Lee (2005) and Lindsay et al. (2003).

There are few methodologies that support definition (B) of process management as a more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness. Biazzo and Bernardi (2003) describe four strategic decision-making areas that form, what the authors define as a process management system:

- *Process architecture*
- *Process visibility*
- *Monitoring mechanisms*
- *Improvement mechanisms*

The components they present bear a resemblance to the methodologies that support the definition (A), but with an emphasis on holism and the connection between the work processes and the strategic objectives of the organization.

The tools suggested to be used when working with process management are diverse. *Process mapping*: McKay and Radnor (1998), McAdam and McCormack (2001), Biazzo (2002) and Isaksson (2006); *Process measurements*: Melan (1992) and Lockamy III and McCormack (2004); *Process re-engineering or redesign*: Lee and Dale (1998), DeToro and McCabe (1997) and McKay and Radnor (1998); *Models for continuous improvement such as the PDSA-cycle*: DeToro and McCabe (1997) and Lee and Dale (1998); and *Instruments for benchmarking*: DeToro and McCabe (1997) and Lee and Dale (1998).

### Purpose and results of implementing process management

The purposes of implementing process management found in the literature include: to remove barriers between functional groups and bond the organization together (Jones, 1994; Llewellyn & Armistead, 2000); to control and improve the processes of the organization (Melan, 1989; Pritchard & Armistead, 1999; Biazzo & Bernardi, 2003; Sandhu & Gunasekaran, 2004); to improve the quality of products and services (Melan, 1989; McAdam & McCormack, 2001; Sandhu & Gunasekaran, 2004); to

identify opportunities for outsourcing and the use of technology to support business (Lindsay et al., 2003; Lock Lee, 2005); to improve the quality of collective learning within the organization and between the organization and its environment (Bawden & Zuber-Skerritt, 2002); to align business processes with strategic objectives and customer needs (Lee & Dale, 1998); and to improve organizational effectiveness and business performance (Jones, 1994; Elzinga et al., 1995; Armistead et al., 1999).

In a review of empirical research, numerous results of implementing process management are found. A survey from manufacturing plants in the USA shows that process management is one of the core quality principles that have significant impacts on quality (Zu, 2009). The results achieved from implementing process management in a Swiss bank are described by Küng and Hagen (2007) as reduced cycle time, increased output per employee and increased quality of work products. Process re-engineering and management logic and techniques are used as enablers for the successful introduction of one-stop shops in a number of Italian municipalities; the approach resulted in reduced throughput times and a single interface with entrepreneurs was established and empowered (Ongaro, 2004).

Empirical research at Volvo Cars between 1994 and 2000 (Hertz et al., 2001) describes the results of the work with process management as decreased inventory costs, shorter lead times, increased delivery precision and higher customer satisfaction. Forsberg et al. (1999) found, based on a survey of the application of process management in Swedish organizations, that the introduction of process management gave positive results in the following areas: common language, cooperation, customer orientation, cost, lead time, learning abilities, a holistic view and standardization.

Findings similar to those of Forsberg et al. (1999) have also been reported by Garvare (2002). Telephone interviews with managers of 62 small and medium-sized Swedish enterprises revealed that in their opinion the general response from personnel when implementing process management had been positive or very positive. A majority of the respondents claimed that since the introduction of process management their company had improved its financial result, recognized increased customer satisfaction, increased its customer base, become more efficient and reached a higher level of delivery accuracy. The main problem areas because of the implementation of process management included bureaucratic documentation procedures and difficulties when trying to involve older personnel and middle managers.

DeToro and McCabe (1997) state that a change towards process management requires not just the use of a set of tools and techniques, but a change in management

style and way of thinking. According to Rentzhog (1996), the implementation of process management includes both structural and cultural changes to the organization.

### Process maturity models, organizational structures and roles

Several models of process maturity have been described in the literature; see examples in Table 2.1. Sentanin et al. (2008) present a maturity model developed by Goncalves (2000) describing five stages (A to E) of companies moving towards a process-based organization, i.e. from a strictly functional model to a stage essentially based on processes. Sentanin et al. (2008) use this model to identify the process maturity level of their case, a Brazilian public research center that is placed in the second stage (B).

The second process maturity model is presented by Lockarmy III and McCormack (2004) and describes the stages from an ad hoc to an extended maturity level. The third model is based on empirical research at the Swedish car company Volvo between 1994 and 2000 (Hertz et al. 2001). Hertz et al. (2001) present a three-level model combining the orientation (production, cost and network) with the organizational focus (functional, project and process).

**Table 2.1 - Process maturity models.**

| Goncalves (2000) in Sentanin et al. (2008, p. 485) | Lockamy and McCormack (2004, p. 275) | Hertz et al. (2001, p. 138) |
|---|---|---|
| **Stage A:** No decisive steps towards a process-based organization. Can only perceive their manufacturing/core process. | **Ad hoc:** Processes are unstructured and ill-defined. Organizational structure is based on traditional functions. | **Production orientation/functional organization:** Focus on labor productivity, delivery to stock, and product quality. |
| **Stage B:** Identified processes and sub-processes, but focuses on functions. Started reducing bottlenecks. | **Defined:** Basic processes are defined and documented. Organizational structure includes a process aspect. | |
| **Stage C:** Identified and improved core processes. Functional mentality with power in the functional units. Might add technology to core processes and eliminate non-value-adding activities. | **Linked:** Process management is employed with a strategic intent. Broad process structures are put in place outside traditional functions. (Breakthrough level) | **Cost orientation/project organization:** Focus on delivery speed, TQM and process reengineering. |

| | | |
|---|---|---|
| **Stage D:** Distribution of resources in core processes. Appointment of process owner responsible for managing each core process. Traditional organizational structure. Success in improving isolated processes. | **Integrated:** Organizational structure is based on processes; traditional functions begin to disappear. Process measures and management systems are deeply embedded in the organization. Cooperation with suppliers and customers on process level. | |
| **Stage E:** Organizational structure designed based on the logic of core processes. | **Extended:** Multi-firm networks with collaboration between legal entities built on trust and mutual dependency. | **Network orientation/process organization:** Focus on speed and precision, customer satisfaction and network effectiveness. |

The first two maturity models by Goncalves (2000) in Sentanin et al. (2008) and Lockamy and McCormack (2004) argue for a full transition from a traditional functional organization (Stage A or Ad hoc) to an organization fully based on processes (Stage E or Extended) and the transition all the way from Stage I – A strictly functional organizational structure – to Stage III – A strictly process-based organizational structure (Figure 2.7).

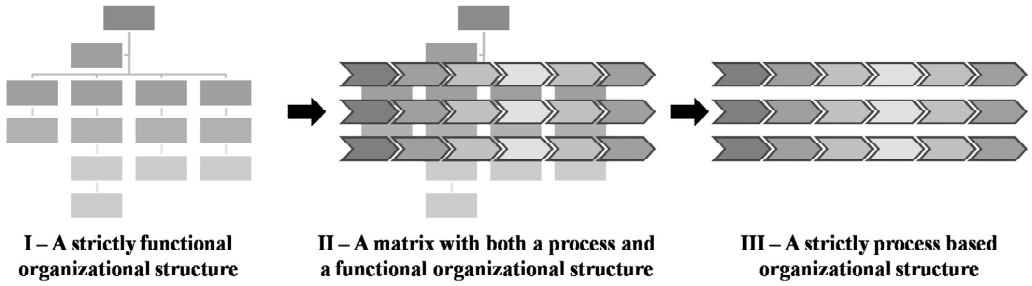



**Figure 2.7 - Three different organizational structures from a strictly functional organizational structure (Stage I) to a matrix structure with both a process and a functional organization (Stage II), and finally a strictly process-based organizational structure (Stage III), from Paper 2.**

Hertz et al. (2001) describe a conflicting, more moderate transformation, where a process management structure is "matrixed onto" the existing organization, as in Stage II – A matrix with both a process and a functional organizational structure – of Figure 2.7. Using the same line of reasoning, Ongaro (2004) concludes that process management should not be seen as a question of all or nothing, but as a continuum between better process-related knowhow of the employees to an organizational and technological solution. Also supporting a more moderate line are Küng and Hagen

(2007, p. 86), who state that "process management does not entail the absence of traditional hierarchical relations … [it] usually leads to a matrix framework".

There is a possible danger of working too hard on building a prominent process management structure within an organization. A new hierarchical structure, going horizontally through the organization instead of top-down, could be created.

A similar discourse can be seen in the area of roles and responsibilities. On the one side, Ongaro (2004) argues that the process owner must have authority over process aims and staff resources. On the other side, Hertz et al. (2001) identify process managers without formal authority.

From the case of a Brazilian research center, Sentanin et al. (2008) present one reason for resistance to a process organizational structure, suggesting managers lose authority and power, as well as losing out financially, because of the reduction in hierarchical levels in the organization.

## 2.3 Complex adaptive systems

Traditionally, modern science focuses on independent variables that assume causal relationships. Accordingly, to understand the behavior of a system we need only address the impact that each independent variable has on that system. However, more and more events occur when the relationship between variables seems to be interdependent. As Gharajedaghi states, "increasingly we are finding out that our independent variables are no longer independent and that the neat and simple construct that served us so beautifully in the past is no longer effective." (Gharajedaghi, 1999, p. 13).

Concepts that deal with CAS have many names: chaos theory (Tetenbaum, 1998), complexity theory (Smith, 2005), complexity science (Kelly & Allison, 1999; Stacey, 2003a) and systems thinking (Senge, 1990). Several authors agree that it is premature to call the above-mentioned concepts theories (Cohen, 1999; Lissack, 1999; Smith, 2005). However, there is an increasing number of results, models and methods that give us insights into the interdependent dynamics of systems that can be found in a variety of domains (Cohen, 1999).

There is much literature on complexity and complex systems from different disciplines: *mathematics* (Smith, 2005), *physics* (Zohar, 1990; Gell-Mann, 1994, 1995; Marion & Uhl-Bien, 2001); *chemistry* (Nicolis & Prigogine, 1989; Prigogine, 1989, 1997); *biology* (Kaufman, 1993; Bird, 2003), *social sciences* (Stacey, 1995, 2003a, 2003b; McKergow, 1996; Stacey et al., 2000; Mitleton-Kelly, 1998); and *leadership, innovation and learning* (Marion, 1999; Streatfield, 2001; Fonseca, 2002;

Griffin, 2002; Shaw, 2002). Ackoff (1999) argues that the work of von Bertalanffy (1968) and his general systems theory were major stimuli for the awareness of the nature of systems and the implications of their nature for effective organizations and management.

In the following sections, two classifications are suggested for the components of CAS: (1) properties of CAS (Figure 2.8) and (2) approaches for managing CAS (Figure 2.9). The elements of each, i.e. the properties and approaches, will be presented. An earlier version of this section of the thesis is also published in the research report Palmberg (2009).

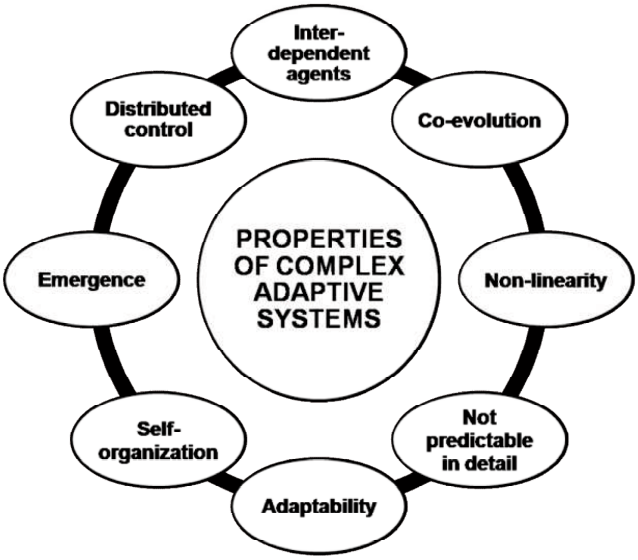



**Figure 2.8 – An overview of the properties of complex adaptive systems (CAS) assembled by the author.**

### Properties of complex systems of interdependent agents

According to Zimmerman et al. (1998), a system is a set of connected or interdependent agents, where an agent may be a person or an organization. It is by contemplating the whole, and the relationships and interactions between agents, that one understands a system; not by the absolute knowledge about each agent (Richardson, 2008; Senge, 1990; Zimmerman et al., 1998). Augustinsson (2006) presents the ideas of the physics Nobel laureate Murray Gell-Mann (1995), who argues that we need to cherish the people who dare to look at "the big picture" because organizations are not just the sum of their components (agents), but also the intricate relationship between the components (agents).

### *Interdependent agents: only understood in their context*

If you look at an organization as a CAS the departments, teams or individuals are interdependent agents who act in that system. It is termed interdependency because each part in the system can affect the behavior or properties of the whole (Ackoff, 1999). Deming (1994, p. 50) argues that "a system is a network of interdependent components that work together to try to accomplish the aim of the system". Each agent is seen as a CAS (Richardson, 2008). Kelly and Allison (1999) argue that agents in CAS are autonomous – thinking, conscious, decision-making individuals who make decisions and take responsibility for their decisions.

Organizations are seen as open systems, by that, Gharajedaghi (1999) means that the system can only be understood in the context of its environment. An example of an open system is illustrated by Kelly and Allison (1999) by looking at human cells. Clearly, a cell membrane defines the boundary of a system, while at the same time enabling nutrients, information (electrical impulses) and waste to pass through the membrane.

### *Co-evolution: acting and reacting in cooperation and in competition with other agents*

In the connected world of today, no agents act on their own. An agent's actions affect other agents in its system. Organizations act and react in cooperation and in competition with other agents. Kelly and Allison (1999, p. 16) state:

> Evolution is the theory that those species survive that are most capable of adapting to the environment as it changes over time. … In a rapidly changing global market, for example, the actions of one company (departments or teams) trigger actions and reactions in other companies (departments or teams), whose actions trigger responsive actions in the first. … Co-evolution is the reason companies today must run as fast as they can just to maintain their current positions.

Regarding the combination of cooperation and competition, Tim Bray, director of Web Technologies at Sun Microsystems states in Tapscott and Williams (2006, p. 27) that:

> We genuinely believe that radical sharing is a win-win for everyone. Expanding markets create new opportunities. … Contributing to the common is not altruism; it's often the best way to build vibrant business ecosystems that harness a shared foundation of technology and knowledge to accelerate growth and innovation.

### *Non-linearity: how small changes can make a big difference*

A central property of CAS is their non-linearity. Between the agents of CAS exists dynamic, varying and non-linear relations and interactions (Augustinsson, 2006). An

effect of non-linear relations is that the size of an outcome from CAS does not necessarily correlate with the size of the input (Zimmerman et al., 1998; Richardson, 2008).

### *Not predictable in detail, but with structures and patterns*

When analyzed in detail, CAS are not predictable because of their interdependencies and non-linearity. However, it is still possible to find inherent order in the chaos. Senge (1990, p. 290), makes the case that "the art of systems thinking lies in seeing through complexity to the underlying structures generating change". The concept of these underlying structures is inspired by fractals in mathematics, as Kelly and Allisson say (1999, pp. 15–16):

> Fractal structures are those in which the nested parts of a system are shaped into the same pattern as the whole. This is called self-similarity. … We can build on the nature of the fractal structures and generate an organization that can change direction quickly. In a business in which self-similarity of values and beliefs has emerged at all levels and in all geographic areas, effective teams can be assembled very quickly to take advantage of sudden opportunities or handle unexpected threats.

### *Adaptability: adaptable to new conditions in the environment*

CAS are seen as adaptable, which means that they have the ability to learn from their own experience and adapt to new, unexpected conditions (Zimmerman et al., 1998).

### *Self-organization: creating order out of chaos*

Some argue that self-organization is the cause of emergence (Tapscott & Williams, 2006). Independent agents acting together will unwittingly create something new. Self-organization is a self-enhancing process that aims to construct and retain current structures (Augustinsson, 2006).

For self-organization to take place it takes a state of bounded instability. This state is often described as "the edge of chaos" (Kelly & Allison, 1999). In this state, organizations (CAS) have the ability to create order out of chaos (Gharajedaghi, 1999). Organizations use their cultural codes in the same way as biological systems use genetic codes to self-organize (Gharajedaghi, 1999).

### *Emergence: to develop capacity that is more than the sum of the capacity of the parts*

Emergence is a property of a CAS that comes from the interaction of many participants (agents) (Lissack, 1999; Gharajedaghi, 1999). It is a property of the whole, not of the parts (Gharajedaghi, 1999). Emergence is "the creation of attributes, structures and capabilities that are not inherent to any single node in the network" according to Tapscott and Williams (2006, p. 44). Richardson (2008) states that

emergence is often portrayed as a process whereby the properties of the whole emerge from the properties of the parts.

***Distributed control: order without central control***

The property of distributed control is opposite to hierarchical central authority, which directs all agents (Zimmerman et al., 1998). "Just because no one is 'in control' does not mean that there is no control. In fact, all healthy organisms have processes of control." (Senge, 1990, p. 292).

An example of a distributed, self-organizing system from biology is the Physarum polycephalum, a slime mold that is a cross between single-celled and multi-cellular organisms, often referred to as the "many-headed slime". It lacks a nerve system and no central part controls the whole organism. Professor Toshiyuki Nakagaki from the Japanese Hokkiado University has studied the slime mold for over 15 years. Even if the molds are presented with something entirely new, they have the ability to adapt to the new conditions. Through his research (Nakagaki et al., 2000), he has shown that the slime mold will choose the shortest and safest route through a labyrinth. A slime mold searching for food first covers a surface and when part of it has found food, it creates thicker threads between the places where the food was found in order for it to use it effectively.


**Figure 2.9 – An overview of approaches for managing a complex adaptive system (CAS) assembled by the author**

### CAS cannot be controlled – but there are approaches for management

A number of authors strongly argue that CAS cannot be controlled, for example Cilliers (2000) cited in Augustinsson (2006) and Stacey (2003a). They argue that a system cannot be designed to predict a certain result. According to Tapscott and Williams (2006), even though a CAS cannot be controlled, as is assumed in the approach of the traditional management of hierarchical organizations, it can be steered. Deming (1994) states that a system must be managed, and that it is the job of management to direct the efforts of all components towards the goal of the system. The literature presents a number of approaches regarding the management of an organization as a CAS (Figure 2.9).

#### *Creating a vision that generates a shared picture of the future*

If any one idea has inspired organizations, it is the capacity to hold a shared picture of the future we seek to create (Senge, 1990). Traditionally in organizations, visions are broken down into strategic plans and action plans that describe how the vision should be realized. As an alternative Gharajedaghi (1999, pp. 104–105) describes an interactive-type of planning where the future is assumed to be created by what we and other agents do between now and then.

Within the same scope as interactive planning, Zimmerman et al. (1998, p. 27) suggest that "intricate strategic plans be replaced by simple documents that describe the general direction the organization is pursuing, and a few basic principles for how the organization should get there". That is, to build a good enough vision to provide a minimum specification that generates a shared image of a desired future of the system. This should encourage the flexibility, adaptability and creativity in the systems and enable individuals (agents) to become more active (Zimmerman et al., 1998).

The basic idea is to leave behind the principle of managing through detailed instructions, which decreases the freedom of the individual agent and, instead, lead by making people embrace visions and stimulating individual agents to use their inherited abilities (Sandberg & Targama, 1998).

#### *Attractors – there is no such thing as resistance, there is only attraction*

It is argued that there is no such thing as resistance – there is only attraction. To make something happen, all one has to do is create stronger attractors than the ones in place. Senge (1990, p. 95) states "do not push growth, remove factors limiting growth". Zimmerman et al. (1998, p. 12) suggest that it is important "to move the natural energy in the system rather than to fight against it".

### *Simple rules to enable complex behavior*

Chaos is constrained by the rules and boundaries that govern it (Tetenbaum, 1998, p. 25). In 1986, Craig Reynolds was trying to program a computer simulation of a flock of birds. With the available computer capacity, it was difficult to make the calculations, since the birds expressed such a complex behavior when flying. Instead, he created a simulation of autonomous agents (boids) whose behaviors were governed by just three rules (steering behaviors), which described how an individual boid maneuvers based on the positions and velocities of its nearby flockmates (Reynolds, 2001). His three rules were:

1. *Separation*: steer to avoid crowding local flockmates;
2. *Alignment*: steer towards the average heading of local flockmates; and
3. *Cohesion*: steer to move towards the average position of local flockmates.

The remarkable thing was that, governed by these three rules, the flocks of boids could handle varying environments, which were filled with obstacles, without being controlled or steered. As Zimmerman et al. (1998, p. 26) states:

> It does show that simple rules – minimum specifications – can lead to complex behaviors. These complex behaviors emerge from the interactions among agents, rather than being imposed upon the CAS by an outside agent or explicit, detailed description.

Dee Hock, founder of Visa, also states that "a simple, clear purpose and principles give rise to complex intelligent behavior. Complex rules and regulations give rise to simple, stupid behavior".

### *Experimentation and reflection – let direction arise*

While the traditional approach of problem-solving is to start with an extensive analysis of the problem, the problem-solving approach when managing CAS is to experiment; to act and learn, instead of planning, try to analyze until a certainty is reached and then act.

> When we find ourselves in situations far from certainty and agreement, the management advice contained in this principle is to quit agonizing over it, quit trying to analyze it to certainty. Try several small experiments, reflect carefully on what happens and gradually shift time and attention towards those things that seem to be working the best (that is, let direction arise). (Zimmerman et al., 1998, pp. 35–36)

If an organization is going to start to experiment in order to solve problems, reflection is, therefore, a key skill in CAS. Reflection should aim at learning from the

experimentation. The challenge is to shift the attention to the things that seem to be working the best.

> "esting, and learning from testing, should become central to any organization's decision- making. (Davenport, 2009, p. 76)

It is suggested that a leader can increase an organization's and an employee's ability to learn and create understanding by institutionalizing the questioning of everything and by using interpretation instead of analysis (Sandberg & Targama, 1998).

The good thing about learning is that:

> Social learning is not the sum of the isolated learning of each member. It is the members' shared learning as manifested in a notion of shared image and culture. … But unlike energy, knowledge is not subject to the 'laws of conservation'. One does not lose knowledge by sharing it with others. The ability to learn and share knowledge enables socio-cultural systems to continuously increase their capacity for higher levels in organization. (Gharajedaghi, 1999, p. 86)

### *Chunking – to build on what works*

When agents have experimented on a small scale to try something new or solve a problem, Zimmerman et al. (1998, p. 39) suggest that, instead of planning an implementation of the new solution, managers should use the approach of chunking.

> Chunking means that a good approach to building complex systems is to start small. Experiment to get pieces that work, and then link the pieces together. Of course, when you make the links, be aware that new interconnections may bring about unpredicted emerging behavior.

To summarize, the approach is to start with an issue that is overwhelmingly complex with small, simple experiments. Perform the experiments and reflect carefully. Adopt the good parts by dropping what clearly will not work and continue by linking the pieces that work together, and allow the solution to emerge.

### *Feedback – a key factor affecting learning*

Feedback is the action of feeding or reporting back the results of an action to the people performing that action (Kelly & Allison, 1999). According to Eurat (2006), cited in Augustinsson (2006), feedback is accepted as a key factor affecting learning. It is the concept of feedback that allows for emergence, self-organization, adaptability and learning in CAS (Richardson, 2008).

There are two kinds of feedback, given slightly different names by different authors: amplifying and balancing (Kelly & Allison, 1999); reinforcing and counteracting (Senge, 1990); and positive and negative (Augustinsson, 2006). Normann (2001),

cited in Augustinsson (2006), calls the second kind correcting. If, to create control and predictability, a system is managed by a majority of balancing/ counteracting/negative/correcting feedback, innovation may not occur (Augustinsson, 2006).

It is suggested that there should be a prerequisite for healthy CAS to contain both types of feedback (Bird, 2003, cited in Augustinsson, 2006). With both types of feedback, the system will have little equilibrium and will be sensitive to its surroundings. The existence of both types of feedback results in the whole system speeding up, according to Wood (2002), cited in Augustinsson (2006).

### *Tension – to challenge instead of simplify*

Just because the approach of simple rules is suggested above, it does not mean that everything should be simplified. In fact, just the opposite is required. Traditionally in the industrial era, stability was a success factor among organizations. Today, with the pressure to remain innovative and flexible, managers instead need to create an environment of tension and instability.

> Theoretical studies of complex adaptive systems suggest that creative self-organization occurs when there is just enough information flow, diversity, connectivity, power-differential and anxiety among the agents. Too much of these can lead to chaotic system behavior: too little and the system remains stuck in a pattern of behavior. (Zimmerman et al., 1998, p. 31)

It is a challenge for managers to keep the tension level where it generates dynamic imagination without exceeding people's ability to handle the stress engendered (Tetenbaum, 1998). One approach to creating tension is to ensure that the organization is diverse (Zimmerman et al., 1998).

# 3 METHODOLOGY

*Chapter 1 presented the background, purpose and research questions of this thesis and Chapter 2 described the frame of reference. The next step in the research process is to choose the methodologies through which data will be collected and analyzed in order to find answers to the research questions posed. In this chapter, the research approach and paradigm in which the research has been conducted is presented. Furthermore, the research strategy is presented and discussed.*

## 3.1 Research approach

### The role of scientific paradigms

The approach and strategy chosen for performing research is guided by the researcher's view of science (paradigm) (Gustavsson, 2007). The scientific paradigm is defined by the researcher's view on reality (ontology) and the nature of knowledge (epistemology). Gustavsson (2007) describes three different scientific views: objectifying, interpreting and critical. Lincoln and Guba (1985) instead use the terms positivist and naturalist.

Gustavsson (2007) argues that the positivist perspective is a part of an objectifying view on science. He claims that even though there are few researchers who would categorize themselves as positivists, positivistic thinking has made a lasting impression on many people's views on how science should be conducted. Positivistic thinking is based on assumptions of stability – that there is one reality and that complex relationships can be explained by the use of logic (Gustavsson, 2007). According to positivistic thinking, knowledge can be developed by the researcher independently from the context studied; the knower and the known are independent (Lincoln & Guba, 1985).

The interpreting view and the naturalist paradigm have many similarities and are both based on the assumption that there are multiple realities. The interpreting tradition in social science argues that the social world must be understood from within (Hollis, 1994, cited in Gustavsson, 2007). Both the pre-understanding of the researcher and the context studied are important since they affect the interpretation of the studied phenomena (Gustavsson, 2007). Lincoln and Guba (1985) describe this by stating the knower and known are interactive and inseparable.

### My paradigm – a shift

With a background in engineering, I have been raised in a positivistic paradigm with the approach of analysis by reduction and drawing on conclusions through cause and effect logic, and the assumption of stability. Having been brought up in the natural

sciences, my mind is trained to find causes for the things I see, but I have started to recognize that this is not always the best way to go about it. Some things we see can be a dynamic result of a combination of factors; it is the description of the combination, rather than identification of the single factors, which is the reason for the results. My own view is that in such cases the use of positivistic thinking might be less effective.

My growing experience of organizational realities as a consultant and researcher, and my methodological development through literature studies, courses and practice, has affected me in many ways. When working in and with organizations the understanding of multiple realities has evolved. Just because theory, managers or logic says something does not mean that it is perceived that way by employees in an organizational setting. I have developed an insight into the need for exploratory, descriptive and interpretative approaches when trying to address issues related to organizational management.

In order to find answers to the research questions posed, four case studies have been performed (see Chapter 1 for an overview). In the first two studies (Papers 1 and 2), the approach was to be non-interventionistic. Adler and Adler (1994) describe non-interventionism as when the researcher is not trying to influence the object being studied. In Studies 3 and 6, the case was almost the opposite. I performed action and interactive research with the double purpose of finding answers to my research questions and providing some practical knowledge to the organizations under study.

## 3.2 Research strategy

The use of case studies is becoming an increasingly applied approach in many management research disciplines because of their ability to investigate little-known and complex phenomena, such as organizations (Gummesson, 2000, 2007, 2008). The case study is often chosen because it is interpretative, systemic and holistic, and aimed to provide full and rich descriptions (Gummesson, 2005). Lee et al. (2007) argue that empirically-based case studies have the potential to contribute to the development of both theory and practice.

The two paradigms described above – positivistic thinking and interpretative approach – are demonstrated in the two contrasting case study approaches presented in Table 3.1. In a review of articles on qualitative research published in leading American journals, the case study approach presented by Yin (2003) is found to be the most predominantly used (Lee, 1999 in Lee et al., 2007). According to my frame of reference, the case study approach of Yin (2003) can be categorized positivistic thinking. The approach is described in the next section (Table 3.1, Figure 3.1).

A case study approach which aims to be more explorative and interpretative than Yin's variant is presented in later sections (Table 3.1, Figure 3.2). It is inspired by grounded theory (Glaser & Strauss, 1967; Glaser, 1992; Corbin & Strauss, 2008), management research (Gummesson, 2000), Miles & Huberman (1994), and Lincoln and Guba (1985).

The description of the more exploratory and interpretative approach is based on experiences gained during previous studies, additional methodological studies and the identification of a need for research that can contribute more directly to the development of practical knowledge in the management field. The objective is to be open to and strongly driven by the influences of practitioners. A comparison between the case study approaches is presented in Table 3.1.

**Table 3.1 – A comparison of case study approaches suggested by Yin (2003) and the case study approach described in Paper 5 and in Figure 3.2.**

| | Case study approach using a positivistic thinking (Yin, 2003) | Exploratory and interpretative case study approach |
|---|---|---|
| **DEFINE & DESIGN** | • Propositions to be examined – reflecting a theoretical issue<br>• Theory development prior to data collection<br>• Selection of similar cases to prior studies<br>• Data collection protocol as a blueprint for the study | • Pre-understanding guiding the identification of relevant concepts and cases to study<br>• The use of loose concepts allowing for research problems to emerge during the research process<br>• Purposeful selection of cases to study, based on pre-understanding<br>• Emergent design of study |
| **PREPARE, COLLECT & ANALYZE** | • Conducting each case study separately, according to protocol<br>• Writing individual case study reports, according to protocol | • Iteration between:<br>– Theoretical sampling of data sources<br>– Data collection with open interviews exploring the loose concept<br>– Continuous and inductive coding and categorizing of data |

| | | |
|---|---|---|
| **ANALYZE & CONCLUDE** | • Cross-case conclusions are drawn<br>• Theory is modified, policy implications are developed | • Interactive analysis with practitioners for the research to be open for concepts to emerge from the data and for new explanations to evolve<br>• Both practical and academic results |

Both case study approaches have been used during my research. The studies of experiences of process management (presented in Papers 1 and 2) have been performed using the approach suggested by Yin (2003). The study of the education system of Nacka municipality (labeled Nacka hereafter, presented in Paper 6) follows the more explorative and interpretative case study approach. The study of Agria Pet Insurance (labeled Agria hereafter, presented in Paper 3) is a combination of the two approaches.

### Case studies in positivistic thinking

When describing the case study method, Yin (2003) does not explicitly adhere to any specific paradigm, but often uses the metaphor of the laboratory, describing the properties of natural sciences as something for social science to strive for.

The design of a case study according to Yin (2003) (Figure 3.1) directs attention to the propositions that are intended to be examined within the scope of the study – reflecting a theoretical issue. He proposes theory development as a first and essential step prior to data collection. Theoretical propositions and research design "will effectively force you to begin constructing a preliminary theory related to your topic of study" (Yin, 2003, p. 28), thereby providing a blueprint for the process of data collection.

As a next step in the "define and design" phase, Yin suggests that "each case study and unit of analysis should be similar to those previously studied by others or should innovate in clear, operationally-defined ways. In this manner, the previous literature can also become a guide for defining the case and unit of analysis" (Yin, 2003, p. 26).

The design of the data collection protocol, parallel to the selection of cases, includes thorough planning of the case study from defining objectives, finding relevant theory, designing field procedures and case study questions to developing a guide for the final case study report (Yin, 2003, pp. 67–69).

The second phase of "prepare, collect and analyze" includes conducting the study of each case separately, and writing individual case study reports. In the final phase of "analyze and conclude", cross-case conclusions are drawn. Finally, theory is modified, policy implications are developed and a cross-case analysis is performed.

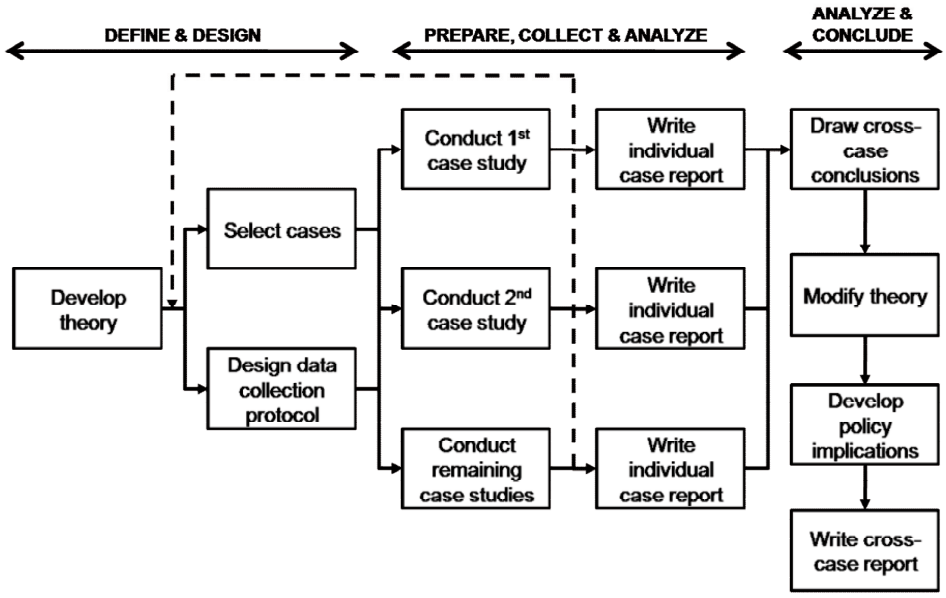



**Figure 3.1 - The case study approach of Yin (2003, p. 50), predominantly used in qualitative research according to Lee (1999, in Lee et al., 2007).**

When using the case study approach presented by Yin (2003), much attention is focused on the first phase of "define and design". Yin states that case study planning should be as detailed as a laboratory instruction, where the whole of the study including the report is planned in detail prior to the start of the study. The approach presupposes the assumptions of the single reality being stable – the idea of analysis by reduction and the search for cause and effect logic.

### An explorative and interpreting case study approach – creating understanding, not models of causality

An alternative approach is presented in Figure 3.2. The three overarching phases of methodology are the same, but the emphasis and content differ. In the suggested alternative case study approach, the "define and design" phase is short and based on the researcher's pre-understanding of the area of study rather than on previous research and theory. Using his or her pre-understanding, the researcher is urged to identify relevant concepts of interest and make a purposeful selection of cases to study.

The second phase of "prepare, collect and analyze" includes iteration between the theoretical sampling of data collection sources and data collection followed by the coding and categorization of the data. The last phase of "analyze and conclude" starts with the interactive analysis of the concepts and categories inductively generated from the previous phase. The primary interaction is with management practitioners, preferably informants during data collection. The objective of the interactive analysis is a combination of academic and practical results.

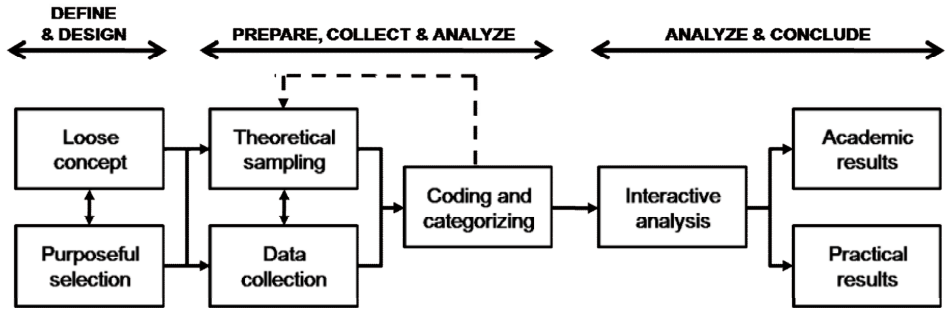



**Figure 3.2 - Described exploratory and interpretative case study methodology for management research.**

## Pre-understanding instead of theoretical frames of references and hypotheses

Several authors oppose the traditional argumentation, presented by Yin (2003), that previous research and theory should guide the formulation of research problems and the selection of cases and serve as a basis for data collection. The increased need for researchers to interact with organizations to develop new knowledge on management is stated in the introduction of this thesis. Sandberg and Targama (2007) make the point that the development of our society stresses the need for understanding, instead of finding the causal relationships between events. Svensson (2008) claims that "knowledge exists outside academia" and adds that our task as researchers is to interact with organizations to develop new knowledge on management. Gummesson (2005) argues for a twofold task of the researcher: to contribute to science and help solve practical problems.

The work of Carol Weiss (1977, 1980, 1986) has been summarized by Starrin (1993), including four different functions of research: political, instrumental, interactive and conceptualizing. The urge seems to be for more interactive and conceptualizing research that can be applied in organizations. Weiss (1977, 1980, 1986) describes the conceptualizing function and purpose of research as contributing with concepts, ideas, understanding and insights that can have an impact on how we relate and affect our standpoints. This is in line with Corbin and Strauss (2008), who describe the

purpose of research (grounded theory in their case) as contributing to a common language through which researchers, professionals and others can come to discuss ideas and find solutions to problems.

Glaser (1992) stresses how professional and private experience and in-depth knowledge of the area under study truly help strengthen the researcher's sensitivity in handling the material. Corbin and Strauss (2008, p. 19) define sensitivity as "the ability to pick up on the subtle nuances and cues in the data that infer or point to meaning".

Still, researchers have to be aware of their pre-understanding from prior personal and professional experience, values and knowledge. Individual pre-understanding will guide the research throughout the research process and should be seen as an asset rather than a burden. To develop a pre-understanding in the field of study, Gummesson (2000) suggests actively participating in a process rather than performing interviews or making observations – taking on the role of a change agent or consultant. Being a change agent or consultant might increase access to information, thereby strengthening the fulfillment of an important quality criterion in management action research, according to Gummesson.

Miles and Huberman (1994) describe the need for researchers to describe their paradigm and pre-understanding because all choices in a research process are guided by the researcher's particular logic or conceptual lens – whether the researcher is aware of it or not.

An attempt to describe my pre-understanding is presented in the preface of the thesis. My background of combining the roles of researcher and consultant has given me the opportunities to drive numerous process management projects in several kinds of organizations, contributing to my understanding of the issues. The study of system management in the education system of Nacka only happened because of my assignment as a consultant, where I was exposed to the unconventional ways of management. In the studies of Agria (Paper 3) and the education system of Nacka (Paper 6), I had the combined role of change agent and researcher, which has given me superior access compared with the first two case studies (Papers 1 and 2).

### Purposeful selection of cases as an alternative to statistical selection

The base for the first three studies is the mainly quantitative studies made by Rickard Garvare, with my assistance as an assistant research fellow during 2000 and 2001 (Garvare, 2002). His studies aimed to discover the obstacles and possibilities when using process management in small and medium-sized organizations. A mail questionnaire was sent to 1500 statistically sampled organizations from a register,

and telephone interviews were conducted with 62 managers from those organizations participating in the mail questionnaire. The results encouraged deeper examination of how organizations choose to work with process management and this is where my research sets off. Garvare's two studies were mainly quantitative and looked at a few factors in a high number of cases.

The first selection of organizations for Study 1 came from those which previously claimed they were actively working with process management (Garvare, 2001). The selection and execution of case studies in Study 2 were made in collaboration with Henrik Eriksson, who was examining organizations using the SIQ Model for Performance Excellence as a tool for quality improvement. He had also previously identified a number of organizations that were successful in their quality efforts. Together we choose three organizations to visit for further examination.

Contrasting with statistical sampling, as in the case of mail questionnaires and the deduction of cases, Kalleberg (1993) presents the concept of varied research when seeking knowledge and learning by studying variations in reality, including studies of successful examples in the chosen field of interest. Based on the argument that knowledge of successful practical management is crucial for creating thriving organizations (Eriksson & Krantz, 2008), in combination with Kalleberg's (1993) proposal of the varied approach, the suggestion for case selection was to look at deviating, successful examples. This is in line with statements made by Lincoln and Guba (1985) regarding a purposeful selection instead of using the traditional approach of finding a selection of cases that are statistically representative of a population.

The principle of varied research of successful, deviating examples is operationalized in Study 3 – Agria, the two-time recipient of the Swedish Quality Award – and Study 6 – Nacka, who received several instances of national recognition of their results.

### Loose concepts instead of defined research questions

In Studies 1 and 2, where several organizations were visited, case study protocols were used to ensure the same procedures were always followed in order to strengthen the reliability of the study (Yin, 2003). The interviews were prepared through tests of the questions with our colleagues based on our hypothesis from theoretical studies.

Starting with a precise research question and most often a hypothesis (Yin, 2003) creates a behavior of the researcher setting out to uncover what he or she thinks is "out there". The research will then focus on accepting or rejecting the ideas that the researcher has created from the preliminary theory constructed. If something

unexpected turns up, that could be a risk. If the irregularity does not fit well into the case study design and protocol, it might be excluded.

An alternative to the previously defined research question is proposed by Löwy (1992), who discusses the importance of loose concepts, or a tentative area to study. Her case lies within the field of immunology, where loose concepts have allowed the development of stable "zones of interaction" between professional groups. She argues that loose "boundary" concepts play an important role in the construction of scientific knowledge and in the growth of a discipline. Boundary concepts facilitate heterogeneous alliances between professional groups, enabling them to "work together and to develop areas of efficient collaborations ('trading zones' or 'pidgin zones') without, however, obliging them to give up the advantages of their respective group identities" (Löwy, 1992, p. 391).

To initiate a study with a loose concept of interest makes it possible for the research problem to emerge and evolve during the research process. The risk that the researcher has not grasped the true concerns experienced by the practitioners in the field of management, and thereby will conduct irrelevant research, is decreased by having an open mind about the area of study. Problems and limitations will be discovered and defined during the research process. In the later studies of Agria and Nacka, the loose concepts of "process management" and "systems management" have been used.

### Theoretical sampling and data collection – open instead of structured interviews

Theoretical sampling is an expression used within grounded theory, implying that the selection of data collection opportunities – interviews, observations, documents etc. – evolves during the process rather than being predetermined (Corbin and Strauss, 2008). The same idea also exists in qualitative research, where it is usually called purposeful or purposive sampling. A challenge for researchers during data collection is to generate data reflecting the different perspectives on the loose concept under study. The initial sampling aims to cover the case under study with a representation based on the loose concept under study. In the presented case studies of organizations, data collection covers the organization, including managers and employees at different levels, departments and, if applicable, different sites.

At the site visits in Study 1, semi-structured interviews were made, primarily with those who had been the driving force behind the initiative of working with process management. These persons were identified after previous telephone interviews (Garvare, 2002). In Study 2, the same approach was used, i.e. semi-structured

interviews with representatives from different hierarchical levels including managers, managers responsible for working with process management and employees involved in the work. In Study 2, visits to the organizations were extended to one day to allow more time to observe and understand the environment at the companies.

These studies are different from the method of data collection in Studies 3 and 6. The combined role of change agent and researcher provided access to direct observations, including small talk, which helped experience the organizational culture almost from within. Gummesson (2005) describes what he calls "corporate anthropology", where the characteristic of long periods of study (several months or years) is borrowed from true anthropology. Inspired by anthropology/ethnography, data are collected through personal interviews and direct or participant observation documented not only in field notes, but also in photos, films and artifacts.

I completed my masters thesis at Agria during summer 2003, after the initial contact for Study 2 and investigating their methodologies and tools for improvement. When I finished my masters, we made arrangements for Agria to finance my research for my licentiate degree from autumn 2004 to winter 2005. During that period, I split my time between the Division of Quality and Environmental Management at Luleå University of Technology and working on developing Agria's process management initiatives. This arrangement provided access and experience and led to the work published in Paper 3.

In the case of Nacka, I had worked as a consultant for about a year before I suggested the study of the management principles of the education system, presented in Paper 6. During the year that the study lasted I have continued to work as a consultant in several parts of the municipality.

### Inductive analysis instead of known categories

During the process of data collection, concepts emerge from the data. They could be areas of interest, problems or issues that are brought up during interviews or underlying patterns or behaviors that relate to the loose concept being studied. As concepts emerge, the researcher should continue to collect data to explore the concepts discovered further. Concepts are essential because, by the very act of naming phenomena, we fix attention on them and can begin to ask questions and examine them (Corbin & Strauss, 2008). During data collection, concepts emerge continously. Glaser (1992) argues that emergence and discovery just happen, often in a faster way than expected.

A phase of category development follows. I often use affinity diagrams to organize the material into categories. Usually, the observations and emerged concepts are

transcribed onto Post-it notes and sorted into themes that form categories. Corbin and Strauss (2008) state that categories are abstractions which represent not only one individual or group's story, but rather the stories of many persons or groups. These stories are reduced to, and represented by, several highly conceptual categories. Details are included under each category to provide a fuller picture. I usually work with "power points" where a category is expressed in a sentence as a headline and the underlying observations and concepts (post-its) are expanded in bullet points below. These power points constitute a basis for the interactive analysis performed in the next step.

Concepts and categories are developed using open coding. Glaser (1992, p. 15) describes it as the research process having "a fresh start, open to the emergent. One does not begin with preconceived ideas or extant theory and then force them on data". Glaser (1992) argues that the researcher must code for whatever category emerges on whatever unit in the data.

The use of open coding instead of predetermined categories is a considerable difference in methodology from the case study of Agria, where the values of TQM described by Bergman and Klefsjö (2003) were used as predetermined categories in analyzing the data. Reflecting on this approach and comparing it with the use of open coding in recent studies, a conclusion is that the data that fit well with the earlier categories became included in the analysis, but the data and findings that deviated were hard to contain in the analysis. In this way, the analysis becomes almost self-fulfilling.

### Interactive knowledge creation with practitioners

An objective of interactive analysis is the development of knowledge and joint-learning between the researcher and the participants (management practitioners), who have preferably been a part of the data collection phase as informants. The basis for the interactive analysis is the result from the previous step – aggregated categories concerning the loose concept under study. One challenge of the interactive analysis is to make sense and understand the meaning of the categories in relation to the loose concept under study. Connections and relationships between categories that explain behaviors and events could occur during the interactive analysis. These relationships have the purpose of creating understanding and knowledge about the loose concept under study – not to explain or predict events in cases other than those studied.

Larsson (2006) claims that the involvement of participants in the interactive analysis creates better theories which lead to new insights, unexpected explanations, an innovative perspective and new concepts and theories. Furthermore, Larsson (2006)

indicates that the involvement of the participants in a joint-learning process might make it difficult to plan a research process in advance. This can be contrasted with Yin's (2003) approach, where the whole research process is thought to be planned ahead of starting data collection. The interactive approach opens up for impressions and ideas introduced and discovered during the research process. One of the purposes of the approach to case studies presented in Figure 3.2 is to open up for adjustments according to discoveries made along the way.

The degree of feedback to the studied organizations shows a clear development in my role as researcher. In the first two studies, no feedback was made to the participating organizations. In the study of Agria, continuous feedback was made to those involved in the process management work, but no structured feedback was given. This is compared with the study of Nacka where an interactive seminar was held with all interviewees. The result of the case study has been spread across the education system in Nacka through several seminars, where the presentation of the material had been requested. A reflection is that the variation of feedback depends on the experience of interactive research in both the participating organization, but most of all on the knowledge and experience of the researcher.

## 3.3 Assessing the quality of the research

Gummesson (2000) suggests that the quality of management research should be assessed in relation to the way research results are perceived to facilitate finding solutions to actual problems and that the management action science paradigm requires its own quality criteria. He suggests eight points of assessment (Gummesson, 2000, pp. 186–187):

1. Readers should be able to follow the research process and draw their own conclusions;
2. As far as realistically feasible, researchers should present their paradigm and pre-understanding;
3. The research should be credible;
4. The researcher should have had adequate access to data;
5. There should be an assessment of the generality and validity of the research;
6. The research should make a contribution;
7. The research process should be dynamic; and
8. The researcher should possess certain personal qualities.

The presented research should, as a suggestion, be evaluated using these criteria. The layout of this thesis and the appended papers is intended to enable the reader to follow the research process and draw their own conclusions (Point 1 above). In the

preface and in this chapter, I have tried to disclose my paradigm and pre-understanding (2). I hope that I fulfill the personal qualities Gummesson (2000) suggests at point 8. The judgment of credibility (3) and whether the research is a contribution (6) is for you, as a reader, to decide. Access to data (4) has improved during the research journey, from half-day visits with one or two interviews per organization in the first study to the combined role as change agent and researcher in the studies of Agria and Nacka. The validity and possibilities of generalizations (5) are presented below. The above presented case study approach is an attempt to develop a dynamic research process (7).

### The validity of the studies

The validity of a study is a measure of how well the concepts that should be studied are being studied. Johannessen and Tufte (2003) define validity as how well the data represent the phenomenon that is being studied. To strengthen the validity, Yin (2003) suggests, among other approaches, using multiple sources of evidence – triangulation.

Patton (1987) discussed four types of triangulation: Data triangulation of data sources; investigator triangulation among different evaluators; theory triangulation of perspectives on the same data set; and methodological triangulation of methods. In this research, the first and last kinds of triangulation have been used to strengthen the validity of the inquiry. In Studies 1 and 2, a multiple case study strategy has been used to strengthen the robustness of the study. Furthermore, both managers and employees (multiple data sources) were interviewed in the organizations.

For data collection, different methods have been used such as methodological triangulation, i.e. both interviews and observations have been conducted. The observations were foremost made to confirm the information from the interviews and give a more vivid picture of the organizations. It is important to make clear that many of the descriptions and conclusions presented in this thesis have been based on information provided by the participating organizations themselves.

The situation in the action and interactive research of Agria and Nacka is another. The access and assignment as a change agent enabled the development of a picture of the organization to complement the picture delivered by management. In many ways, these two pictures corresponded, but not always.

### Case-to-case generalization instead of statistical or analytical generalization

The concept of generalization of research results originates from quantitative research and is based on sampling and probability theory. Firestone (1993) describes

traditional extrapolation from sample to population – where a sample is drawn from an identified population – as one of three arguments for generalization. The other two are analytical generalization (or extrapolation using theory) and case-to-case transition. Analytical generalization is described as follows: "One uses the theory to make predictions and then confirms those predictions. In a specific study, predictions hold under specific conditions. If the predictions hold only under those conditions, they become scope conditions that limit the generalizability of the theory." (Firestone, 1993, p. 17).

Transferring findings from one case to another is made possible by the researcher providing a rich, detailed, thick description of the case and the surrounding conditions for the findings. Thick descriptions are used to help the reader bridge the gap between the written case and the reader's reality where the findings could be applied. The intended argument of generalization in all the studies presented in this thesis can be categorized as case-to-case.

## 3.4 Reflection on the role as researcher, action researcher and consultant

I have naturally been affected in my role as a researcher by the close relationships with both Nacka and Agria. This would have been a great problem if my intention had been to judge the approaches of the two organizations. However, the purpose of the investigations at Agria and Nacka was to identify and describe the approaches that have made these organizations successful[2], making it possible for others to "steel with pride" by enabling understanding of the approaches of these organizations. The close relationships, as an action researcher and consultant, have allowed significant access compared with the role I had as a researcher in the first two studies.

[2] The success of the organizations has been judged by others. In the case of Agria, it was their status as two-time recipients of the Swedish Quality Award. In 2008, the education system in Nacka received an evaluation from the Swedish National Agency for Education, stating that the results were exemplary in schools and that the knowledge level among the pupils was above average in the country.

# 4 SUMMARY OF APPENDED PAPERS

*This chapter summarizes the background and purpose, methodology and findings and conclusions of each of the six appended papers. See each paper for a more detailed description.*

## 4.1 Paper 1 – Case studies of process management in small and medium-sized enterprises

*Garvare, R. and Palmberg, K.*

### Background and purpose

Small and medium-sized enterprises (SMEs) account for a large proportion of total businesses in most countries. SMEs differ from larger organizations in several aspects, for example in terms of specialization, formalization and resources. Still, quality related programs developed with large companies in mind are increasingly being employed in SMEs. Process management is one TQM program that has enjoyed widespread use in recent years. A previous study by Hansson (2003) shows process management to be problematic for small companies. This paper presents the results of process management case studies in seven Swedish SMEs.

### Methodology

In Garvare (2001), a study of process management in Swedish SMEs is presented. Experiences have been examined through 1500 mailed questionnaires, telephone interviews with 62 senior managers and case studies at two of the participating companies. Presentations of the two case studies, carried out during 2001, are included in the paper as Companies F and G.

To further evaluate the results of implementing process management in SMEs, additional case studies have been performed at five of the companies participating in the telephone interviews of the study presented in Garvare (2001). These five case studies (Companies A to E in the paper) were carried out during 2002.

### Findings and conclusions

The general findings were that the studied companies had not changed directly from a functional-orientated organization to a process-orientated organization. Instead, they were still in, or had recently passed through, an intermediate state characterized by a team and project-based organization where focus was shifting towards a cost reduction emphasis. Transitions described by the case companies presented in this paper have been summarized schematically in a model with three different stages:

starting with functions, continuing via teams and projects and ending with processes (Figure 4.1).

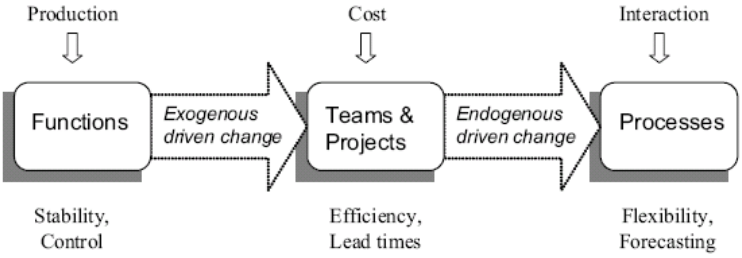



**Figure 4.1 – Stages of process implementation in studied small and medium sized enterprises. Idea and design inspired by Hertz et al. (2001).**

## 4.2 Paper 2 – Experiences of implementing process management: a multiple-case study

*Palmberg, K. Accepted to Business Process Management Journal, May 2009. Earlier version presented at and published in proceedings from the 8th QMOD Conference, Palermo, 29 June-July 1, 2005.*

### Background and purpose

Many organizations experience problems during the implementation of a process management approach. The purpose of the paper is to explore and describe the organizational implications when implementing process management, how to handle the relationship between the functional organization and a process perspective and the roles of managers, teams and individuals. It describes the experiences of introducing process management into three different organizations.

### Methodology

A case study approach is used. The selection and execution of the case studies were made in collaboration with a study examining organizations using the SIQ Model for Performance Excellence as a tool for quality improvement (Eriksson & Garvare, 2005). The primary sources for data collection in these studies have been interviews and observations. In addition, one of the organizations (Agria) has been closely examined in action research over a period of two years following the multiple case study.

### Findings and conclusions

It seems that all three studied organizations have found ways to use process management not just as an approach for improving single processes, but also as a perspective for managing the whole organization.

To summarize, there seems to be almost as many purposes of implementing process management as there are organizations attempting it. The results found in the studied organizations cover:

- increased understanding of strategies and customer needs among employees;
- standardization of work procedures, enabling cost savings;
- more effective use of employees;
- sharper economic control; and
- ease of driving improvement.

People in the studied organizations express an increase in well-being combined with a concern about the risk of stress caused by increased individual responsibility among employees. All three studied organizations have introduced a process management structure into their functional organizational structure, including the introduction of new management positions such as process owners and process leaders.

In the introduction of the paper, two different discourses are presented. On the one hand, a full transformation from a functionally-orientated organizational structure to a fully process-oriented organizational structure is favored. On the other hand, a more moderate transformation where a process management structure is "matrixed onto" the existing organization is preferred. The analysis of the three studied cases could be interpreted as supporting the second line of reasoning, where the functional and process structures co-exist in the organization, creating a constructive dynamic. The implication is that complexity is created rather than reduced to handle the need of several parallel perspectives on the business.

## 4.3 Paper 3 – Sustained quality management: how to receive the Swedish quality award twice

*Palmberg, K. & Garvare, R. Published in the International Journal of Quality and Reliability Management, 2006, vol. 23, no. 1, pp. 42–59.*

### Background and purpose

In December 2003, Agria became the first company to receive the Swedish Quality Award twice. This notable success was the result of a change process that started 10 years ago. The question of why Agria had succeeded in implementing and sustaining a TQM program was the starting point of a research project that took place between 2002 and 2006. The purpose of the paper is to describe how Agria has organized its quality-related work through a sustained and systematic focus on the basic elements of quality management.

## Methodology

The methodology employed for the study has been mainly qualitative using semi-structured interviews and direct observations as primary tools for data collection. Over a period of two years, the researchers visited the company several times and conducted interviews with both managers and other employees.

For three months in 2003, one of the authors was positioned at Agria, carrying out the study in the form of action research.

## Findings and conclusions

In conclusion, it seems clear that nearly all managers at Agria have succeeded in focusing their leadership on values and visions rather than rules and regulations. The basic values are more than just words; they truly characterize operations at the company. The study has focused attention on joint leadership as an explanation to this achievement.

During the action research part of the study, we found that Agria has been working with operations improvement on three different levels (Figure 4.2). The levels of improvement differ in extent and degree of systematization and in degrees of how mature the organization has been in its work with quality-related issues.

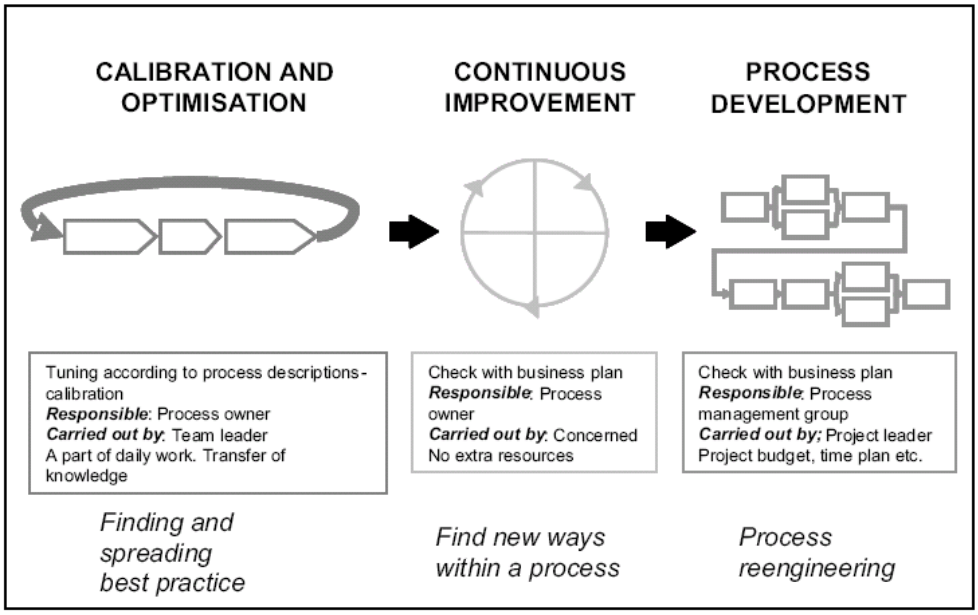



**Figure 4.2 – Levels of change and operations improvement.**

The third level is process development – a discontinuous and often project-based approach with groups assigned to specific improvement tasks. It consists of

knowledge and systems for running large development projects. The middle level of this model is continuous improvement – finding new ways of shifting trends in process performance based on new ideas or indications. The first level has been called calibration and optimization. Work on operations improvement at the first level is supposed to ensure that routines and process descriptions are followed as intended, micro-improvements of practice are made within present routines and best practice is developed and spread across the entire workplace.

## 4.4 Paper 4 – Exploring process management: are there any widespread models and definitions?

*Palmberg, K. Published in The TQM Journal, 2009, vol. 21, no. 2, pp. 203–215.*

### Background and purpose

The starting point for the study was the idea that the lack of well-established conceptual models and definitions of process management plays a role in the challenge and difficulty facing organizations when trying to manage their processes on a strategic level. The purpose of this study was to explore whether there are existing widespread models and definitions for process management in the literature. The aim of the paper is to describe and explore the findings from the study.

### Methodology

A structured literature review was used to identify contemporary models and definitions for process management. In order to enable a structure for categorizing this material, three areas of interest were selected based on the purpose of the review:

1. process definitions, categorizations and roles;
2. definitions of process management; and
3. approaches and tools for process management.

### Findings and conclusions

The findings on the descriptions of process management from the literature review are structured and summarized in an aggregated model for process management (Figure 4.3). The model describes a summary of the process definition, categorizations and roles described in the literature included in the review. Later, it describes purposes and definitions and approaches and tools for process management.

The result and analysis of the literature review shows, in line with earlier research, that there seems to be no common definition of the concept of processes and process management. Still, there are similar components in the process definitions of the included literature. These can be condensed into a net definition, found at the top of Figure 4.3.

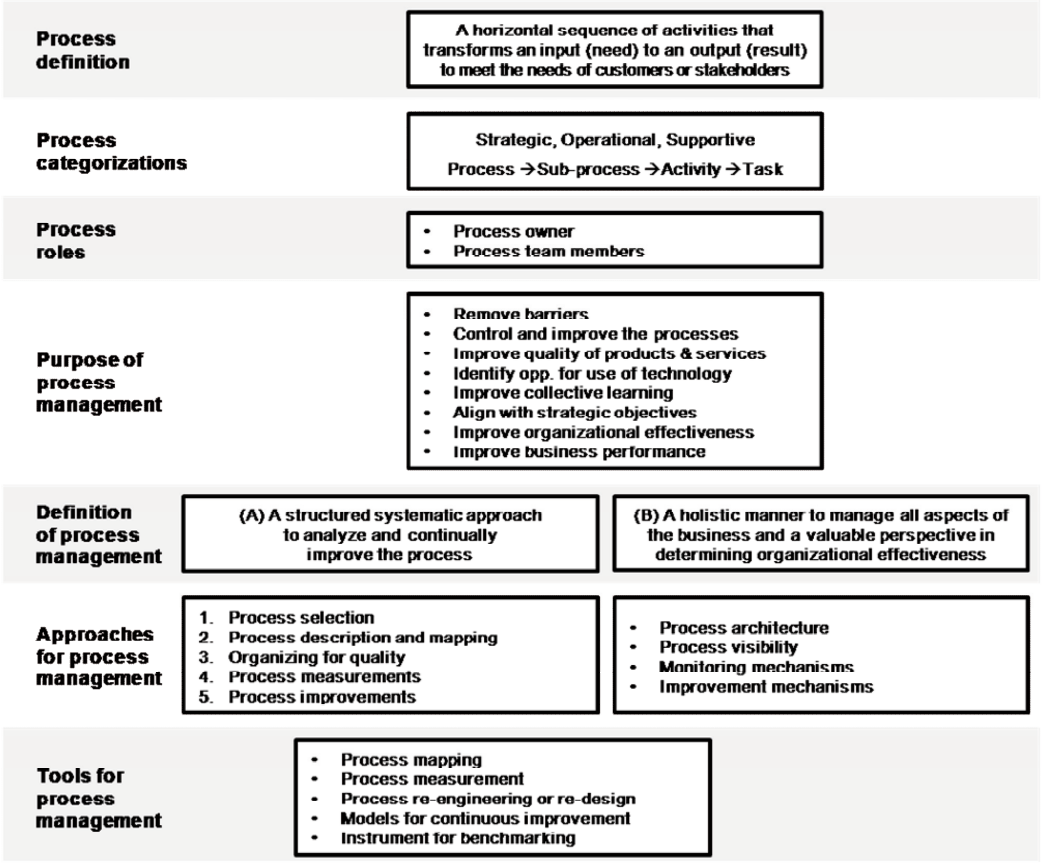



**Figure 4.3 – Model summarizing the result and analysis of the literature review of descriptions of process management.**

There are several descriptions of process management presented in the literature, but no well-established definition. This is in line with previous research. However, the result and analysis of the definitions of process management in the included literature shows two different movements: (A) process management for single process improvement and (B) process management for system management.

The varying purposes of working with process management, described in the covered literature, demonstrate a diverse need for both movements of process management. Still, the focus of a majority of the identified tools and approaches for process management is to contribute to the more mechanistic movement (A) of systematically improving single processes. It is a technical and instrumental approach that characterizes the definition of, and approach for, process management in movement (A).

When it comes to the more holistic movement (B), process management as one of several valuable perspectives in the system management of an organization, hardly any tools and approaches were found in the literature. Even the identified approaches corresponding to movement (B) can be applied in a linear, mechanistic way – contributing successfully to single process improvements but not as effectively to a strategic and holistic management of the whole organization.

## 4.5 Paper 5 – An alternative case study approach in management research

*Palmberg, K. To be published in Vägval och dilemman in interaktiv forskning [Crossroads and Dilemmas in Interactive research, in Swedish], M. Elg, & B. Andersson Gäre (eds), Linköping University.*

### Background and purpose

The business environment has changed radically during the past decades and there is now an increased need for researchers to interact with organizations in order to develop new knowledge on management. Case studies are a widely used approach for management research, yet the traditional case study seems to be predominantly based on a positivistic and deductively-focused approach. In opposition, a more holistic and inductive approach is suggested. The purpose of the paper is to discuss and reflect on how to increase the relevance of management research through improved methodological choices.

### Methodology

The paper is based on literature combined with the researcher's own experiences of conducting case studies.

### Findings and conclusions

The traditional approach, where previous research and theory guides the case study, is rejected in favor of the researcher's pre-understanding being emphasized, guiding the identification of relevant concepts and a purposeful selection of cases to study. The planning phase is followed by iteration between the theoretical sampling of data sources and data collection. Data are continuously coded and categories emerge inductively. The analysis is performed interactively with management practitioners. The objective of the alternative case study approach is to reach a combination of theoretical and practical results and be open to, and strongly driven by, the influence of practitioners. To achieve this in a systematic manner, several methodological steps are introduced. The open and dynamic alternative research process suggested should facilitate increased relevance in management research.

## 4.6 Paper 6 – Complex adaptive systems as metaphors for organizational management

*Palmberg, K. Accepted with revisions to The Learning Organization, May 2009.*

### Background and purpose

There is a need for development of metaphors and language for managing of the new forms of organizing that are evolving. The purpose of the paper is threefold: (1) to explore the concept of complex adaptive systems (CAS) from the perspective of managing organizations, (2) to describe and explore the management principles of the education system of Nacka municipality – a case study of an organization with unconventional ways of management, and (3) to present a tentative model of metaphors and approaches for managing organizations as CAS – system management.

### Methodology

The case study in this paper follows the alternative case study approach presented in Paper 5. Data collection was guided by the question "What are the factors that have generated the success of Nacka's education system, in your opinion?". Interviews were held with both local principals of private and public schools, and administrational employees.

### Findings and conclusions

The frame of reference is based on a literature review of the area of CAS. A classification of the components of a CAS is suggested and described, as well as the properties of CAS and approaches for managing CAS.

With the purpose of contributing to the empirical body of knowledge of organizing and management, a case study of the education system of Nacka municipality, an organization using unconventional management principles to govern, is presented. An inductive and interactive analysis is used to identify the management principles used: a clearly formulated mission, delegation of responsibility and authority, diversity and competition and follow-up and feedback.

As a result of analyzing the frame of reference and the case study, a tentative, conceptual model for managing organizations as CAS – system management – is presented. Figure 4.4 illustrates a suggestion for organizations as CAS containing (1) the system holder, (2) the interdependent agents and (3) the system boundary. The symbol of the CAS reoccurs in the frame of reference and is labeled self-similarity. Every CAS contains other CAS in a recursive order, each with a system holder, interdependent agents and boundaries. The CAS are also surrounded by other CAS.

In Nacka, all schools are CAS within the education system, in line with the description in the frame of reference of CAS with embedded subsystems.

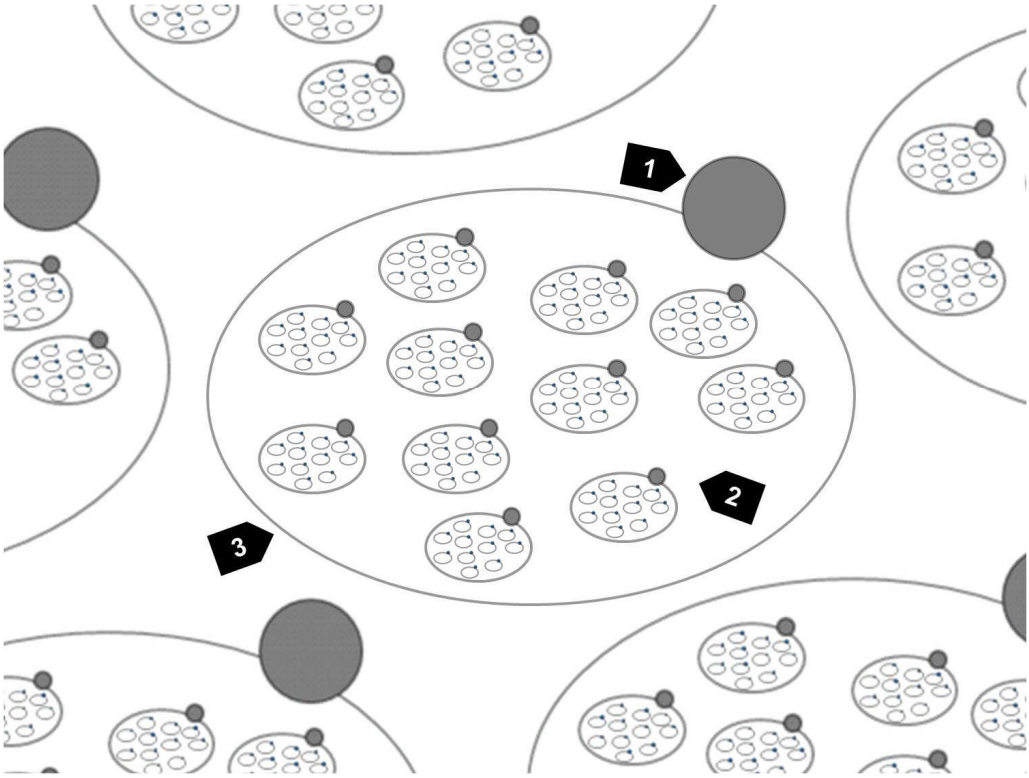



**Figure 4.4 – An illustration of a suggestion of an organization as a complex adaptive system. The arrows indicate (1) the system holder, (2) the interdependent agents and (3) the system boundary.**

The task of the *system holder* is to manage the CAS. This task exists in all CAS that do not have a totally flat anarchical type of governance. Based on the analysis of the results, it is suggested that the tasks of the system holder when managing the CAS are (1) visioning and setting simple rules, (2) building and maintaining follow-up and feedback systems and (3) creating attractors.

CAS are made up of *interdependent agents*, themselves CAS. The control of the CAS is to varying degrees distributed between the system holder and the agents. In Nacka, the far-reaching delegation of responsibility and authority enables the distribution of control to the principals, both in schools owned by Nacka and schools owned by others. Detailed instructions are replaced by visions and simple rules.

The metaphor of the cell membrane can be used when discussing the *system boundary*. It is a clear boundary while at the same time allowing the transportation of

information, fluids and waste. The thickness of the membrane (the degree of definition) depends on the open or closed profile of the CAS. If participation in the CAS is open to everyone, the boundary of the CAS is very vague.

# 5 CONCLUSIONS

*The intention of this chapter is to draw conclusions on the basis of the purpose and the research questions presented in the introduction chapter.*

## 5.1 Exploring and describing organizational implications of process management

### No widespread definitions of process management have been found, but two movements have been identified

In the literature review of process management (Study 4), no widespread models or definitions for process management were found. The lack of widely recognized models for process management was a challenge for both practitioners and researchers. The question of "what is process management?" was posed and two movements, (A) and (B), were identified in the reviewed literature:

A. *The management and improvement of single processes:* A structured systematic approach to analyze and continually improve each process.

B. *A holistic view of process management as a part of managing the organization as a whole:* A more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness.

The diverse drivers for implementing process management (Table 5.1) might be interpreted as a demonstration of the need of movements (A) and (B). Nevertheless, the majority of the tools and methodologies for process management identified in the literature focus on improving single processes (A). Few tools or methodologies are identified for process management as a part of managing the organization as a whole (B).

A potential problem is identified when organizations aim to use process management for both (A) and (B), using the toolbox that has been mainly developed with (A) in mind, but expecting results both at a single process and an organizational level. Based on the results of the fourth study, the dominating focus on the technical and instrumental parts of process management found in many organizations can be questioned. Many research papers focus on the definitions, levels and categories of processes and techniques for mapping and documenting processes on an activity level. In many organizations, quality functions devote extensive resources to designing and building process management structures such as web-based

documentation systems, without discussing how to structurally link the process management work to the strategic objectives and priorities in the organization.

There might be a risk in losing the overall business perspective when focusing too heavily on process maps and tools for documenting, structuring processes and designing the process organization. There is a need for process management practitioners and researchers to develop and formulate approaches and tools that have the potential to contribute to process management, not only on a single process level but on an organizational level.

### The drivers for implementing process management are numerous, but so are the stated effects after implementing process management

The findings of the studies indicate that expectations on process management are high; the drivers for implementing process management are many and wide-ranging. However, expectations are also met by extensively listed stated effects. The drivers for and effects of implementing process management are described in Table 5.1. The columns categorize; the drivers for implementing process management (left) and the stated experienced effects of implementing process management (right). The rows divide the material between; the drivers and stated effects identified in earlier research in the literature (top), and identified in empirical research in my studies (bottom). There is no mutual order among the drivers and effects in each field.

In the empirical research described in the appended papers, some additional consequences identified were; bureaucratic documentation procedures (Study 1), difficulties in involving older personnel and middle managers (Study 1) and possible negative consequences on employee health and well-being (Study 2). Paper 2 discussed whether process management is an approach that suits everyone or if the increased individual responsibility creates too many opportunities and too much uncertainty for employees to handle. Some respondents argue that with the right support everyone can work in a process-oriented organization, while others argue it only suits some people and that the stress can become too high for some.

**Table 5.1 – Drivers for and stated effects of implementing process management. (Sx) indicates from which of the studies the information is gathered, see papers for references.**

| | DRIVERS | STATED EFFECTS |
|---|---|---|
| **Identified in earlier research in literature (from papers 2 and 4)** | Improve organizational effectiveness and business performance (S2) (S4)<br>Create understanding of processes (S2)<br>Align processes with strategic objectives and customer needs S4)<br>Remove barriers (S4)<br>Control and improve processes (S4)<br>Improve product and service quality (S4)<br>Build competitive advantage (S2)<br>Identify opp. for outsourcing (S4)<br>Improve quality of collective learning (S4)<br>Declining market shares (S2)<br>Dissatisfied customers (S2)<br>Dissatisfied employees (S2) | Increased efficiency (S2)<br>Reduced lead times (S2)<br>Increased output per employee (S2)<br>Standardization (S2)<br>Holistic view, my fit in the organization (S2)<br>Common language (S2)<br>Increased internal cooperation (S2)<br>Customer orientation (S2)<br>Increased financial control (S2)<br>Increased quality of products (S2)<br>Decreased delivery costs (S2)<br>Increased delivery precision (S2)<br>Higher customer satisfaction (S2) |
| **Identified in empirical research in appended papers (from papers 1, 2 and 3)** | Declining results (S2)<br>External pressure (S2)<br>Improving operations (S2) (S3)<br>Growth (S2)<br>Reduce operating costs (S2) (S3)<br>Strengthen improvement ability (S3)<br>Need for ability to adjust to changing conditions (S3)<br>The update of ISO 9000:2000 (S1) | Increased understanding among employees of strategies and customer needs (S2)<br>Customer orientation (S3)<br>Standardization of work procedures (S2)<br>Discovery of improvement opportunities (S3)<br>Enabling cost savings (S2)<br>More efficient use of employees (S2)<br>Increased financial control (S2)<br>Increased ability to drive improvement (S2) (S3)<br>Increased well-being among employees (S2)<br>Helps in prioritizing measurements (S3) |

### The transformation from functional organizations to matrix organizations with both functional and process perspectives – increasing the complexity

In the first study, where process management was examined in seven SMEs, the conclusion was that the transition from being a functional organization towards process orientation involves phases of transformation. A three-phase model, inspired by Hertz et al. (2001), was presented (Figure 4.1).

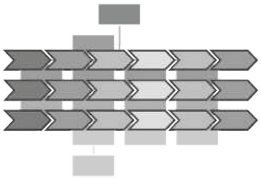
The second multiple case study presented a discourse between those researchers arguing for a full transition from a functionally- to a process-oriented organization (from Stage I to Stage III in Figure 2.7) and those arguing for a more moderate transition where a process management structure is superimposed onto the existing organization to create a matrix (Stage II in Figure 2.7, see also appended Paper 2).

The results of the studies indicate that the studied organizations transitioned from a functional organization to a matrix organization, not to a fully process-oriented organization. A gap was also observed in the first study between the official emphasis placed on process management and the actual level of process management visible in the studied organizations. In Table 5.2, the phases found in the first study are combined with the stages identified in the second study to describe how the transition from a functionally- to a process-oriented organization may look.

When moving away from a functionally-oriented organization it seems difficult finding a totally new way of organizing. The examination of the cases reveals the dilemma of how to handle the relationship between a former, functionally-oriented, organization and a new, process-oriented organization. Working in a matrix, there will sometimes be areas in the organization where the allocation of responsibility is not fully clear to everybody.

The co-existence of a process and functional management structure increases, rather than reduces, complexity in the studied organizations. In the appended Paper 2, the risk of focusing too hard on building a prominent process management structure that creates another horizontal hierarchy as a response to the functional organization is discussed.

**Table 5.2 – A description of the transition from a functional organization structure to a matrix organization, with both a process and a functional structure.**

| | | | |
|---|---|---|---|
| |  | |  |
| ***Study 2*** | **Stage I** – A strictly functional organizational structure | | **Stage II** – A matrix with both a process and functional organizational structure |
| ***Study 1*** | **Phase 1** | **Phase 2** | **Phase 3** |
| ***Focus*** | Production orientation; focus on stability and control of products and activities; low cost pressure; stable environment; and long planning horizon. | Improving internal efficiency; resource effectiveness; cost orientation; and striving for shorter planning cycles and decreased delivery times. | Increasing flexibility and improving process performance while forecasting customer demands and the cost pressure remains high. |
| ***Process persp.*** | May perhaps have the manufacturing process mapped. | Only a few processes are briefly mapped, the process responsibility is informal and only a few individuals have a process perspective. | Central activities are mapped and defined in process terms and a process management structure is introduced into the functional organizational structure including the positions of process managers. |

## 5.2 Exploring the concept of complex adaptive systems from the perspective of managing organizations

### Properties of and approaches for managing complex adaptive systems

The results from Studies 1, 2 and 4 suggest that process management is not the complete answer to the question of how contemporary organizations should best manage and organize their businesses. As presented earlier in this thesis, several authors argue for the possibility of applying complex adaptive systems (CAS) ideas

to managing organizations. In exploring this area, two classifications are suggested for the components of CAS (Paper 6):

- *Properties of CAS:* Interdependent agents, co-evolution, non-linearity, unpredictable in detail, adaptability, self-organization, emergence and distributed control.
- *Approaches for managing CAS:* Visioning, attractors, simple rules, experimentation and reflection, chunking, feedback and tension.

Further descriptions can be found in the frame of reference and in Figure 2.8 and Figure 2.9.

### A tentative, conceptual model for managing organizations as CAS

Paper 6 suggested a tentative model for system management based on a combination of the properties of and approaches for managing CAS and the examination of management principles found in Study 6. The objective of the model is to contribute to the development of metaphors, models and approaches for managing new forms of organizations.

The metaphor of organizations as CAS (Figure 4.4) consists of embedded subsystems, themselves CAS. The three components of the model for system management is (1) the system holder, (2) the interdependent agents and (3) the system boundary. All CAS contain other CAS in a recursive order, each with a system holder, interdependent agents and system boundaries.

The task of the system holder is to manage CAS through the approaches of visioning and setting simple rules, building and maintaining follow-up and feedback systems, and creating attractors. The organization is made up of interdependent agents, themselves CAS. The control of the CAS is to varying degrees distributed between the system holder and the agents. The system boundary is comparable to the cell membrane; a clear boundary while allowing the transportation of information, fluid and waste. The thickness of the boundary depends on the openness of the system.

# 6 CONCLUDING REMARKS

## 6.1 A discussion on management of traditional organizations versus new forms of organizations

In this thesis, two case studies of successful organizations are provided: Agria Pet Insurances and the education system of Nacka municipality (Papers 3 and 6). Both studies set out to contribute to the empirical body of knowledge of organizing and management. After having revisited the material some reflections have emerged regarding similarities and differences in management of the two organizations.

The part of Agria that was studied during 2003–2005 – the Swedish business with about 150 employees – can be categorized as a rather traditionally organized company with a CEO, management team, departments, market areas, support functions and processes. Agria is a part of Länsförsäkringar, a large Swedish bank and insurance organization, but at the time of the study Agria was more or less managed as an independent company. It should be considered that the study was performed several years ago. On the other hand, the education system of Nacka is closer to the new forms of organizing described as networks, mass collaboration, multi-unit enterprises and user contribution systems. See Papers 3 and 6 for case descriptions.

Contributing to the success of Agria is the deployment of a number of quality-related values that leaven through the organization. On the basis on these values, the organization has been able to develop and implement methodologies and tools that strive for improvement. The managers at Agria follow much of the logic of TQM, e.g. values, methodologies and tools, described in the frame of reference (Figure 2.2). It is concluded that every organization needs to find methodologies and tools that support its values.

In Nacka, when managing the education system, politicians and the central administration focus on the desired results, have a strong follow-up system and are explicitly unconcerned about the approaches and deployment the different schools use to reach their results.

With my background at Agria, as an assessor of the Swedish Quality Award and a researcher within the field of quality management, I was surprised that none of the interviewees talked about traditional tools and methodologies when explaining their view on why Nacka was successful. Each school, or organization of schools, had approaches and tools for improvement and learning in their own organization.

However, politicians and the central administration did not use tools and approaches to manage the education system as a whole.

When asked about the absence of tools and methodologies, the Director of Culture and Education replied: "If you understand your task, are normally capable and curious, you do not need centrally-developed tools. You will come up with your own solutions to tackle problems that you observe." At the interactive seminar, the reactions to this finding were quite strong since several respondents had a background in quality management. However, the discussions led to agreement, summarized by the Head of Public Schools as: "We have tools and approaches, but they are not mandatory and we do not manage through tools and approaches."

As earlier stated, when comparing the analysis of the cases of Agria and Nacka some reflections emerge regarding the principles for management. To use the RADAR-model for comparison (see the section on excellence models in the frame of reference):

- **Results** – in both Agria and Nacka the approach of stating what they want to achieve is used. At Agria, foremost through the values and the business planning process and in Nacka through the clearly formulated mission. Both can be compared to the approaches of visioning and setting simple rules in the tentative model for system management.

- **Approaches** – at Agria, the management of the organization is executed using specific methodologies and tools. The system holders in Nacka explicitly do not use methodologies and tools to manage the education system as a whole.

- **Deployment** – see Approaches above.

- **Assess** – in both Agria and Nacka strong follow-up systems are built using the principle of "what gets measured gets done". Both organizations have annual quality assessments (in Nacka the quality report and at Agria the assessment according to an excellence model), follow-up systems that display results transparently (Nacka displays the schools results on the web, Agria displays the results of individual sales employees on boards in the office) and several approaches for measuring all kinds of results.

- **Review** – at Agria, several systematic methodologies for working with learning, innovation and improvement are present from calibration and optimization in the daily work to larger process development work, see Figure 4.2, all based on outputs from the assessments in the stage above. In Nacka, the system holders trust the agents to drive their own learning, innovation and improvement. However, there are indications that the competitive environment in the education system triggers the development of each school, but limits the possibilities for collaboration between schools.

Similarities between the cases of Nacka and Agria are the emphasis on results (values, mission, simple rules and visioning) and the strong follow-up systems in the

assessment stage. The largest contrast observed is in the stage of approaches where the managers at Agria use certain methodologies and tools while those at Nacka explicitly do not manage through the use of methodologies and tools. There is also a contrast between the ability to drive learning, innovation and improvements in the review stage where Agria can use their methodologies and tools to manage the improvement work and Nacka, more or less, do not have any other tools than the competition between schools to speed up the improvement of the education system.

One could argue that the results indicate that managing through values, methodologies and tools suits traditional organizations, but when it comes to the new forms of organizing the situation is different. In a value network based on mass collaboration or a multi-unit enterprise, it is probably difficult for a system holder to argue that all agents should use certain methodologies and tools. Looking at the resemblance between Nacka and Agria and at the conclusions from the studies, the system holder of CAS must be at ease with managing through visioning, simple rules, follow-up and attractors. However, this does not imply that the agents themselves do not need methodologies and tools of their own.

One suggestion is that we cannot manage CAS the way we are used to managing traditional organizations, but maybe we can manage traditional organizations like CAS. Systems management could be yet another perspective to be added to the management palette, meaning the answer is not *either* functional management *or* process management *or* system management, but functional management *and* process management *and* systems management, see Figure 6.1.

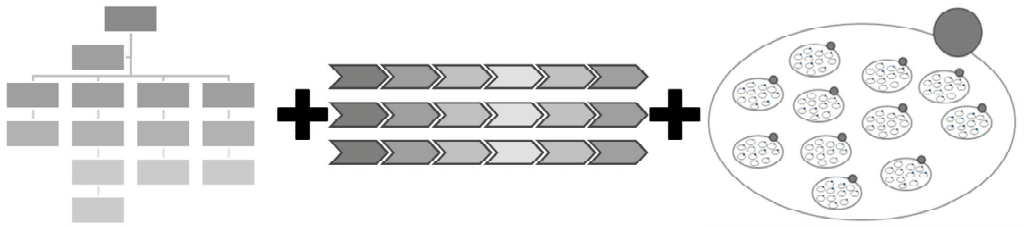


**Figure 6.1 – Systems management as an additional perspective on management of organizations.**

## 6.2 Future research

Process management practitioners and researchers must develop and formulate approaches and tools that have the potential to contribute to process management, not only on a single process level but on an organizational level. There is also a need to develop further knowledge on how to handle the relationship between the functional

and process management structures, the roles of the process manager and the functional manager, and how to manage complexity instead of reducing it.

There seem to be a potential for continuing exploration of the possibility of using CAS as metaphors for organizations and developing approaches for managing organizations as CAS as a complement to structures of hierarchies and processes. A specific need for future research is to explore and develop approaches for how to drive learning, innovation and improvement in organizations as CAS with distributed control.

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# PAPER 1

## Case studies of Process Management in Small and Medium Sized Enterprises

Garvare, R. & Palmberg, K.

# Case Studies of Process Management in Small and Medium Sized Enterprises

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## ABSTRACT

This paper presents the results of case studies of process management in seven Swedish small and medium sized enterprises (SME). These studies are part of a larger research project aiming at describing experiences of introducing process management in SMEs. Our findings were that, in general, the studied companies had not changed directly from a functional orientated organisation to a process orientated organisation. Instead they were still in, or had recently passed through, an intermediate state characterised by a team and project based organisation where focus was shifted towards a cost reduction emphasis. The transitions described by the case companies have been summarised schematically in a model with three stages: starting with functions, continuing via teams and projects, and ending with processes.

Keywords: Process Management, Small and Medium Sized Enterprises, Case Studies

## Introduction

Small and medium sized enterprises[1] (SME) account for a large proportion of the total business in most countries. Their importance as a major engine for innovation and creation of new jobs is often emphasized, see for example Storey (1994).

Quality related programmes developed with the large company in mind are increasingly being employed also in many small and medium sized enterprises. Process management is one of many methodologies within total quality management (TQM) that has found widespread use in recent years, see for example, DeToro & McCabe (1997) and Lee & Dale (1998). However, in a study of quality award winners, Hansson (2001) found process orientation to be problematic for small organisations. In several aspects, for example in terms of specialisation, formalisation and resources, small and medium sized organisations are not like the large ones (Storey, 1994; Ghobadian & Gallear, 1996). Much of the contemporary quality-related systems, methodologies and tools are therefore not necessarily the most suitable for small and medium sized organisations.

The new ISO 9000:2000 series of quality management system standards (CEN, 2000) strongly promotes the adoption of a process approach within the certified company (Garvare, 2000; Tsin et al., 2002). In the standard, the process approach is defined as "the application of a system of processes within an organisation, together with the identification and interactions of these processes, and their management". Organisations must recognise and establish processes together with their sequence and relations, monitor and analyse process perfor-

[1] In this paper small and medium sized enterprises are defined as privately owned companies with between 10 and 200 employees.

mance, and manage and control the processes in compliance with the requirements. It could be argued that the pressure on small and medium sized enterprises to adopt a process approach will probably increase due to the update of ISO 9000. Pritchard & Armistead (1999) state that lack of understanding of process management is the biggest difficulty for organisations in the initial stages of adopting a process approach. To aid the prevention of potential negative consequences, as well as to enhance the utilisation of potential benefits, experiences of introducing process management in small and medium sized enterprises have been investigated.

*Process management*

Modern quality management is based on the idea that to remain competitive an organisation has to ceaselessly upgrade the way it fulfils the true needs of its customers (Dale, 1999). It is not enough to focus on the finished products that customers receive. How these products are produced, i.e. the processes, also needs to be addressed. Strong competition and forever increasing customer demands lead to short product life cycles and rapidly changing product concepts. Combined with escalating complexity of products and processes this emphasises the importance of controlling and systematically managing the processes of an organisation.

Traditionally organisations have been managed vertically and hierarchically with a division of power between functional units. This could lead to ineffective addressing of many cross-functional issues and thereby sub-optimisation of the organisation. By using horizontal process management the organisation is viewed as a network of processes linked across the organisation. According to DeToro & McCabe (1997) policy and direction is still set from the top, but the right to examine and change methodologies and procedures is delegated to cross-functional work teams.

*Empirical Studies*

In Garvare (2001) a study of process management in Swedish small and medium sized enterprises is presented. Experiences have been examined through 1,500 mailed questionnaires, telephone interviews with 62 senior managers, and case studies at two of the participating companies. A presentation of the case studies, carried out during 2001, are included in this paper as Company F and G. Results of the investigation by Garvare (2001) revealed that at a majority of the studied organisations the general response from the personnel when implementing process management had been positive or very positive. Main problem areas included documentation procedures and involvement of middle managers. When the use of process management had been initiated from within the organisation rather than due to pressure caused by external actors, the implementation had more often been successful.

To further evaluate the results of implementing process management in small and medium sized enterprises, additional case studies have been performed at five of the companies participating in the telephone interviews of the study presented in Garvare (2001). These five case studies (Company A to E below) were carried out during 2002.

## Company A

Company A was founded in 1975 and has about 45 employees. It produces and markets electrical equipment for industrial use. Main operations are in the Nordic countries and the Baltic States. The company is certified according to ISO 9001:2000 and is working to become certified according to ISO 14001 within a year.

In 1995 the company began its transition to process orientation. Two years later it became a member of a large international business group consisting of several companies, both large and small. While still an independent business unit, control over some functions has been transferred to other companies. Research and development is today mainly carried out in Germany, while production and marketing are located in Sweden.

*Start and motives*

About seven years before the case study was performed the production manager of Company A attended a lecture and learned about how a large Swedish company worked with process orientated systems in logistics, business and quality management. During this time the production department of Company A was mainly producing for in-company stock shelves. People at the sales department did not feel comfortable when having to sell products that were not already in stock. Despite this strategy delivery time continued to be high. There were quality problems and many products stayed unsold on the shelves, causing high costs to the company. The unsold goods were also tying up material needed for the production of new products that the customers where asking for, and the company had severe difficulties in trying to keep up with changes in customer demands. To stay competitive and remain in business the company was forced to cut lead times and lower costs by making more effective use of its premises.

*Pilot project*

After beginning to learn about this new process orientated way of working the production manager became very interested in the subject, attended courses and read literature. He presented the idea of a horizontal organisation for the management group, consisting of the functional managers and the CEO. A small-scale pilot project was initiated, involving a cross-functional team of about five people representing many of the departments of the company. The entire order process of a standard product, produced on regular basis, was selected as focal point for the project. This process was identified and mapped by the team, from customer order and construction, via production, to testing, packing and delivery. The team was then assigned the responsibility for managing and improving all the steps in the process. To avoid a potential large stock of unsold goods, production was strictly based on customer order. External suppliers closely related to the company were involved in evaluating the results of the pilot project. According to the production manager the approach tested in the pilot project was “a completely new way of working”.

The economy manager of Company A actively supported the pilot project, mainly because he saw advantages in not having a large stock tying up capital. The sales manager, and most of the people in the sales department, did not trust that the new system would be able to deliver products on time. Therefore they argued for having the goods on the shelves when the clients asked for it. Heavy resistance also came from the mechanics, fitters and production personnel. They were used to their old roles, and felt uncomfortable with having to do tasks that were perceived as less qualified, such as packaging or administration. According to the production manager the way employees looked at the status of different jobs was a crucial problem at this

stage of the implementation. “A fitter is a fitter and should not be packing products” was a usual reaction from the personnel. Many employees had the opinion that it was a waste of capacity if highly qualified people also did simpler tasks. Some felt threatened in their positions, mainly in the production department but also within administration and management, as some people might not be needed after a restructuring of the organisation.

*Results*

After the transition to team-based process management and customer ordered production delivery precision of the pilot process went up from 60 percent to 95 percent within the first year. In spite of the great potential shown by this result, people at the sales department were not convinced that the new approach would be beneficial to the company. They chose to focus on the 5 percent that were still not delivered on time, and continued to counteract all changes.

The outcome and repercussions of the pilot project resulted in a slow company-wide transition into an organisation where cross-functional process teams lead by coordinators are responsible for the operational management of all key business processes. The teams make and deliver all the products, both regular production of standard items and specialised production for certain customers. The teams are also responsible for measurements of product quality and delivery precision within their process. According to the production manager “this way of working makes our understanding of customer needs better.”

During the time of the study process management had been the established way of working within the company for more than two years, but there was still some resistance within the sales department, and a few employees had also chosen to leave the company as a result of the restructuring.

Product testing was one of the functions that had initially been incorporated within the process teams. Since the skill and knowledge of the product testing engineers was specialised it proved ineffective to have these persons work as parts of the process teams. After a few months it was therefore decided that a test function, serving all the other teams, should be re-established.

Working with ISO 9000:2000 was perceived by the managers as helpful in reorganising the company. The new standard required a structured processes approach. “Before the transition, the people working here had their jobs. Today we have separate roles, and different people with different knowledge to solve the assignments”, said the production manager. “Today the employees are looking beyond their original professions and are more actively trying to help each other out. It’s not perfect yet, but the territorial thinking between the departments is reducing”, the production manager said.

## Company B

Company B was founded in the early 1990 and has about 60 employees. It is a manufacturer of mechanical components mainly for the vehicle industry. The company is certified according to ISO 9001:1994, ISO 14001 and QS 9000.

Company B is noticeably production orientated. It has a functional hierarchy with a horizontal division of power between units such as finance, manufacturing, distribution, marketing and sales. About one year before the case study was performed Company B became part of a small regional business network. Within this network a program for introducing a process

based way of working among the member companies was initiated. This program has been divided into three steps: measurement, in-house improvement, and teamwork & interaction. During the first step costs of poor quality and the general potential of improvement within the company is measured. In the second step pre-emptive maintenance and improvements based on the previously identified problems are carried out. This step is also intended to bring about a process view among the personnel with a clear notion of the internal value chain, its customers and suppliers. The third step includes improving the interaction and cooperation between the companies involved in the network. Autonomic teams systematically work to control and improve the processes, within the organisation but also within the entire network. The initiative to start this network and the three step program came from a relatively large company in the region which is a customer of Company B. During the time of the case study, Company B was at the first step of the program, and both managers and employees expressed high expectations on the network. Even though Company B is only at the beginning of implementing process management, advantages due to a higher commitment for quality among the personnel have been noticed by the managers.

## Company C

Company C is a privately owned school. It was founded in the 1990s and has about 25 employees. The company has no certified quality management system.

During the time of the study the organisation had a strong customer orientation and highly motivated personnel, determinedly striving to improve methodologies and procedures. The planning horizon was long, cost pressures low and results were measured regularly. However, what had during the previously made telephone interviews appeared to be a process orientated organisation emerged during the case study to be a vision in the mind of a few managers rather than an established way of working within the organisation. No attempt had been made to identify or map existing processes, and there was no written documentation about the horizontal organisation. All the things that were said to be "within the heads of all employees" regarding processes and division of responsibilities, turned out after a deeper enquiry to be very unclear and vague. Company C was therefore classified as a functional orientated organisation with a narrow focus on production.

## Company D

Company D is a family owned sub-manufacturer of process equipment for industrial customers on the international market. The company, founded by an entrepreneur in the beginning of the 1970s, now has about 120 employees. Research and development account for about 10 to 15 percent of total turnover. The company is certified according to ISO 9001:1994, and is working to become certified according to ISO 14001.

*Start*

Three years before the case study was performed a relative to the founder was appointed CEO of the company. At this time the organisation was built on traditional functional departments and a hierarchical chain of command. According to the CEO there was a wide gap perceived between the departments of product development and sales. People at the product development department had a high technical knowledge, but knew little about what the customers wanted. The sales people were in close contact with the customers, but lacked technical knowledge. There were also difficulties in dividing responsibilities between the different departments.

*Reorganisation*

The solution proposed by the new CEO to solve the gap dilemma was the implementation of several new cross-functional segments superimposed on the old functional departments. Each segment consists of a specialist responsible for monitoring all products within the segment during their life cycle, from R&D to post-launch evaluation subsequent to market introduction. The company sometimes develops products that are specially made for specific customers. In these cases the segment specialist involved also continues as contact person towards the particular customer. In the new organisation department managers are responsible for all production resources, and also for the personnel and economy of their department. For each project, resources in terms of money are assigned to the head of the segment, who orders services from the different departments. The department managers then make priorities between the orders from the segments.

During the implementation of the segments, there was also a general geographical reorganisation within the company office. All employees were moved in order to "fit the flow", i.e. to be placed in accordance with their position in the different processes. This was, according to all interviewed at Company D, a very beneficial part of the reorganisation.

*Results*

The general advantage of the new organisation was described by the CEO as "a lasting responsibility". Not only was someone watching over development projects during their whole sequence, but the segment specialists were also responsible for the entire processes within their segments. In the old days there was always a risk that things "fell between the chairs", i.e. that nobody considered themselves to be responsible for handling difficulties and solving problems that were not clearly within the sphere of a single department.

According to many of the respondents at Company D the new organisation has also resulted in a higher customer satisfaction. No specific disadvantage had been experienced due to the new organisation, apart from the few occasions when projects had been launched without a segment specialist assigned to them. In those cases things had rapidly became chaotic, where after someone had promptly been assigned as responsible for the project.

According to representatives of the personnel, there had been some initial insecurity among the employees when the reorganisation was launched. A few of the employees had also left the company due to the changes that had been introduced. Looking back the CEO said he should have put more emphasis on explaining his vision of segments, and the purpose of the reorganisation, already from the start.

## Company E

Company E was founded in 1957 and has about 30 employees. It is a trading company providing industrial customers with a variety of standardised and specially made products and components from manufacturers world-wide. Value is added by offering total solutions, specialist know-how, efficient logistical and IT systems, and a detailed quality assurance system. The company is certified according to ISO 9002:1994 and QS 9000, and was during the time of the study working to become certified according to ISO 14001. Since 1990 the organisation has been part of a trade group consisting of about 50 companies in the Nordic countries, the Baltic States, Germany, and Russia, focusing on import and sales of industrial product components in these countries.

Despite the extra value added, by specialist know-how and by other complements offered by the company, most of the trading products have a very small earning per item. Cost pressure has always been high within the industry, and according to the CEO "the profit lays in working with your internal processes. Concentrating on the processes gives the company opportunities to rationalize, and also provides the employees with a clear view of where they are situated within the whole".

*Start and motives*

The change towards process management started several years ago when the buying department of Company E was to be integrated with the in-house sales department. Some of the functional managers in the company had begun to question the way the organisation was operating, and commenced looking at the flow of work and products through the different departments. They felt there were gaps in the communication within the company, especially between the buying department and the selling department which did not correspond well to each other. Lead times had to be cut and the stock levels had to be lowered. One suggestion that came up was to begin by merging buying and sales into one larger team. A short external management course on organisational change gave the CEO ideas on how to apply and implement the integration. The flow of work in the sales and buying departments had to be identified and mapped before the integration could be performed. Persons involved had to be informed and trained in their new and extended role as being both buyer and seller. When it was finally launched, the project of merging the two departments was already acknowledged by most employees, and also partly implemented on the managerial level of the organisation.

*Results*

Initial results of the restructuring were promising, with shorter lead times, more efficient distribution, and forecasting of customer demand. The new organisation was therefore barely given time to settle before the project continued to also include mapping and analysis of other parts of the company. Now difficulties started to emerge. Many of the employees said that they did not see the point in making further changes to the organisation. The management group had already been handling and working out ideas about the continued streamlining, while many of the employees felt uninformed, unsafe and threatened by the proposed additional reforms. Two employees chose to leave the company due to the restructuring, and the rate of change was slowed down.

At the time of the case study a number of new processes had already been mapped, but there had been no further integration of departments within the company. Process owners had been appointed among the functional managers to coordinate and drive the process development. These process owners had also been delegated responsibilities from the CEO for the personnel working within their process. During monthly meetings every department informed the others about the progress of their improvement projects.

In the forefront of the reorganising activities was the warehouse department, pushing its internal procedures and routines towards a structure of horizontal processes. The partly process orientated organisation has also given people at the warehouse a much higher status and better means of influencing their work situation.

The company has begun outsourcing its administration and computer support systems, reforming the organisation to only include core processes vital to fulfilling the mission of the

company. According to the CEO, "process management is about understanding what we are doing and how we can do it better."

Today measurements are used, more widely than before, as a tool for improvement. Organisational goals are set as a result of strategic planning by the management group. The group, consisting of the functional managers, collects the problems, chooses measures to control and decides who will be responsible for the follow-up. Eventually all functions will have to take part in setting their own goals.

Many of the respondents at Company E said the reorganisation has given them a broader, more holistic picture of the company, thereby increasing their motivation to take part in many daily routines. Every employee at the company now has a personal education plan. According to the CEO:

> "A majority of the personnel now better understands what others want from them, both externally and internally. It used to be 'quality by accident', and then we started defining who the customers and stakeholders are. It is important that all the employees know who is doing what. If the sales people are producing many customer-orders but the warehouse is not able to provide the goods, there is a problem. There is a need for understanding between the departments about working towards the same goal."

## Company F

Company F was founded in the 1950s and has 35 employees. It is a subcontractor in the boat industry and is certified according to ISO 9001:1994.

Eight years before the case study a new CEO took over the leadership of the company. For a few years the business situation had been difficult with heavy expenses and a decrease in sales. The primary focus was on immediate improvement activities, short term problem solving and cost reduction. After about two years the new CEO began transforming the company, from a traditional functional organisation with several departments and a hierarchical chain of command, into a new process based organisation. A flatter team-oriented structure replaced the former top-down hierarchy. One level of authority was eliminated and the functional differentiation was minimised. During this organisational change a few of the middle-managers left the company.

The new organisation required a radical shift in thinking among the personnel. Those who had been used to work according to priorities and quotas set by the managers now had to think much more by them selves. Work design, product inspection, cost reduction and process improvement became the responsibilities of job teams. Two remaining functional managers provided specialised skills in the areas of finance and human resources. The performance of the company increased considerably in terms of reduced lead times, less rework and higher flexibility. Under the strong leadership of the new CEO the company had moved towards a process oriented organisation.

## Company G

Company G was founded in the 1980s and has about 150 employees. It is working in the service industry and has no certified management system.

Two years before the case study was carried out business had been very good. The company had been growing rapidly in terms of sales and employees. To improve internal efficiency and

customer focus the senior management team decided to change the organisation from functional orientation to process management. A person with long experience of implementing process management in other companies was employed as quality manager. In two months he had reworked the organisational chart into a process hierarchy with core processes, sub-processes, operational, supporting and management processes. But the commitment shown by top management was decreasing. The general business climate was deteriorating and the company was losing sales. For about half a year the implementation was halted due to vacillation by the senior management. After six months it was decided that the change towards process management should continue. The insecurity among the personnel resulted in considerable damage to the mandate for change. Through some promising results achieved by the parts of the organisation that was using process management the opinion for organisational change improved. At the time of the case study the reworked process based organisational chart had found widespread use in the company, and one of the key business processes was horizontally managed by an appointed process owner.

## Cross case analysis

Our findings were that, in general, the studied companies had not changed directly from a functional orientated organisation to a process orientated organisation. Instead they were still in, or had recently passed through, an intermediate state characterised by a team and project based organisation where focus were shifted towards a cost reduction emphasis. Transitions described by the case companies presented in this paper have been summarised schematically in a model with three different stages: starting with functions, continuing via teams and projects, and ending with processes, see Figure 1.

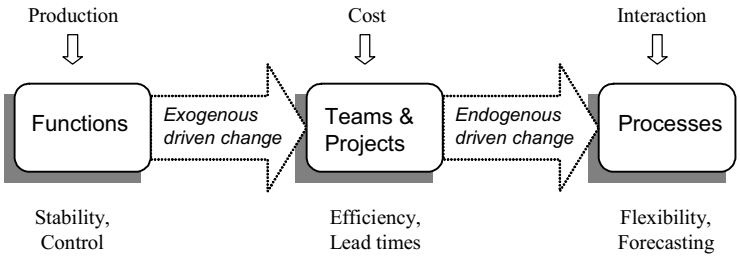


*Figure 1* *Stages of process implementation in studied small and medium sized enterprises. Idea and design inspired by Hertz et al. (2001).*

In all seven cases, the studied companies had originally been production orientated, using a functional approach mainly focusing on stability and control of products and activities. Cost pressure had generally been low with a stable environment and long planning horizons. In the investigated manufacturing companies, produced goods were often delivered to stock, and improvement efforts were primarily concentrated on enhancing product quality. With the exception of the manufacturing process, process responsibility was generally not defined at this stage.

Due to various contextual changes, such as the entrance of a new top manager, or challenging competition leading to a decline in relative performance, five of the seven studied companies had been forced into the second stage of the model. Focus shifted towards improving internal efficiency and resource effectiveness regarding supplies and inventory levels, and a main part of the organisations became cost orientated. In manufacturing companies inventory levels of

both incoming and outgoing goods were lowered, and the planning horizon had to be shortened. Pressure was put on external suppliers to shorten their delivery times. In many of the companies the change was initiated by a manager or owner having discovered new ideas regarding organisational structure or improvement based on a process view. Even when intentions were to directly develop a horizontal and process based organisation, the companies often transited into an approach of teams and projects, focusing on improving distribution and resource utilisation, and on minimising delivery times. Typically, a few administrational processes were briefly mapped at this stage, but process responsibilities were informal and at a low hierarchical level, and process performance was not measured. A majority of the employees had not obtained a clear process view on their organisation. During this stage one or a few key individuals became familiar with viewing the organisation in terms of horizontal processes.

Four of the seven companies had, at the time of the case studies, progressed into the third stage of the model. In these companies the process view had been gradually acknowledged by a majority of the employees, and the organisations had slowly become more process oriented. Central organisational activities were mapped and defined in terms of processes and sub-processes. Process owners were appointed at high levels within the organisations. In one of these companies, process managers with responsibilities for day-to-day operations had been formally appointed. Cost pressures were still high, sometimes even higher than before, but the focus had shifted towards improving flexibility and process performance, and towards forecasting customer demands. A new horizontal structure was superimposed on the organisation, with frequent interactions between individuals at all positions of the company. Process performance was being continually measured in processes with designated ownership. No external driver was identified between stage two and three, and the change was seen as endogenously driven. However, despite any transition towards process management the official organisational charts of all studied companies still reflected the old functional organisation, with no clear identification of customers, suppliers, process owners or process managers.

## Conclusions and discussion

Process management is one of many methodologies related to total quality management that is increasingly being employed in small and medium sized enterprises. The recent update of ISO 9000 appears to be one important explanation to the prevalent and rising interest in process management.

A result that emerges from the case studies is that when changing from functional to process orientation the studied enterprises pass through an intermediate state where the process view is gradually spread and acknowledged within the entire organisation. A clear process view and understanding of the general methodology among a majority of the employees appears to be vital for fully implementing process management. In many of the studied enterprises, process owners are appointed among the functional managers. Instead of completely rewriting the organisational chart the new process organisation is superimposed on the old functional organisation.

Horizontal communication between departments seems to be problematic in a majority of the studied enterprises, and the most common way to solve this problem appears to be the merging of departments. During the case studies, a gap between the official emphasis placed on process management, and the actual level of process orientation visible within many of the studied organisations, was observed.

This paper has highlighted a number of issues when introducing process management in small and medium sized enterprises, which may contribute towards a better understanding of the factors influencing the outcome of different implementation programmes.

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## PAPER 2

# Experiences of implementing process management: a multiple-case study

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# Experiences of implementing process management: a multiple-case study

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## Abstract

**Purpose**: Process management is becoming an essential part of contemporary organizations in all industries. However, many organizations experience problems during the implementation of a process management approach. The purpose of this paper is to explore and describe the organizational implications when implementing process management, how to handle the relationship between the functional organization and a process perspective, and the roles of managers, teams and individuals.

**Design/methodology/approach**: A multiple-case study approach is used to get an extensive picture of and analyze how three Swedish organizations have worked with process management.

**Findings**: The studied organizations have introduced a process management structure into their functional organizational structure, including the introduction of new management positions such as process owners and process leaders.

A discourse is identified in earlier research between those arguing for a full transformation from a functionally orientated to a fully process oriented organizational structure, and those promoting a more moderate transformation where a process management structure is "matrixed onto" the existing organization. The analysis could be interpreted as supporting the second line of reasoning, where the functional and process structures co-exist in the organization, creating a constructive dynamic.

**Originality/value**: The paper provides two major contributions. First, the empirical descriptions and analysis of implementing process management contribute to the knowledge and understanding among both practitioners and researchers. The second major contribution is the identified need of co-existence of a process and functional perspective, and the implication that complexity is created rather than reduced in organizations.

**Keywords**: Process management, implementation, case study, organizational perspective, Sweden

**Paper type**: Case study

## 1 Introduction

Processes and process management are becoming an essential part of contemporary organizations in all industries. Quality management, Six Sigma and Lean all build on components of working with and improving organizational processes (Andersson *et al.*, 2006; Dahlgaard & Dahlgaard-Park, 2006). The new ISO 9001:2008 standard is placing considerable emphasis on processes (ISO, 2009), and process management is a significant part of most excellence models, such as the Malcolm Balridge National Quality Award (NIST, 2009) and the EFQM Excellence Model (EFQM, 2009). When exploring if Six Sigma and Lean are new methods, or if they are repackaged versions of previously popular methods –

Total Quality Management and Just-in-Time – Näslund (2008) emphasises the importance of placing organizational change and improvement methods in general under a process management umbrella.

Zairi (1997) stated, based on a literature review, that the word ”process” had become a part of everyday business language. Hammer & Stanton (1999) argued, on the basis of a study of IBM and Microsoft among others, that for most companies there is no real alternative to shifting from a traditional business to a process enterprise. Organizations in Sweden have been working explicitly with process management since the end of the 1980s. The methodology has been used in order to reduce lead times and increase customer focus both inside and outside the organization, and this development has been attributed to escalating demands from customers regarding quality (Egnell, 1995).

Even though process management is a common approach today, many organizations express concerns about problems with implementing and maintaining a process management approach. In a study of quality award recipients in Sweden, Hansson (2003) found that many small organizations perceive work with process management to be problematic. Based on a survey of the application of process management in Swedish organizations Forsberg *et al.* (1999) state that the expectations for results are unreasonably high. Implementing process management appears to be rather demanding: “In practice, however, the process approach seems difficult to understand and to put into action” (Rentzhog, 1996, p. 13).

In a paper on the definitions and models of process management, the Palmberg (2009) concludes that in both research and in applications in organizations there is a string focus on the technical parts of process management; the definitions of a process, the levels and categorizations of processes, and the techniques for mapping and documenting processes on an activity level (Palmberg, 2009). Many organizations devote extensive resources to web-based documentation systems, presenting their processes in several levels, from main processes down to individual tasks, without achieving the planned effects. This is combined with the often seen confusion and discontent among senior management regarding the perceived lack of clear results from implementing process management.

Through a literature review of the area, Hellström & Peterson (2005) conclude that the literature is foremost built on theoretical reasoning, resulting in a large number of how-to-do checklists. Furthermore, they argue that there is a lack of empirical research into the effects of process management. Hellström & Peterson (2005) believe that “despite a decade of experience of practicing process-oriented management, certain fundamental problems still beset its successful application and causes practitioners concern”. Based on a literature review, O’Neill & Sohal (1999) reach the same conclusion, and state that more empirical research is needed.

Several empirical articles covering tools and methodologies for mapping and improving single processes have been identified (Küng & Hagen, 2007; Sandhu & Gunasekaran, 2004; and Ongaro, 2004, among others). However, few empirically based articles have been found on the organizational issues of implementing process management, how to handle the relationship between the functional organization and a process perspective, and on the roles of managers, teams, and individuals.

Based on the arguments above that process management is becoming essential in organizations, that many organizations experience problems during implementation, and the expressed need for empirical research, the purpose of the paper is to explore and describe the organizational implications when implementing process management. It describes the experiences of introducing process management in three different organizations. The overarching questions have been:

- What was the purpose and what were the results of implementing process management?
- How is the ability to drive improvement affected when implementing process management?
- What are the effects experienced by individuals when implementing process management?
- How are organizational structures, roles and responsibilities affected when implementing process management?

The article is displayed as follows: as a part of a further introduction of process management, the next sections present definitions of process management, the purposes and results of implementing process management found in the literature, and different process maturity models. The next section describes the methodology used when performing the case studies, followed by case descriptions of the organizations studied. The case descriptions are then summarized and analyzed. Finally, conclusions are drawn and a discussion of the implications is presented.

## 1.1 Definitions of process management

The concept of process management is not something entirely new. Shewhart (1931) was one of the first to argue for Process Control in favor of Product Control. During the 1970s, methodologies for working with processes were developed under labels such as Just-in-Time and Lean Production (Schonberger, 1986). In the 1980s and 1990s, the scope of Process Control was expanded to encompass a corporate emphasis, including all functions of an organization. A great deal of attention was focused on Business Process Re-engineering (BPR), as described by, for example, Hammer & Champy (1993). Process management has been on the agenda since the early 1980s, but unlike that of many other management concepts, the interest in process management has remained high (Hellström, 2006).

A recent literature review on process management (Palmberg, 2009), covering 77 articles, indicates that there are no common definitions of the concepts of processes and process management. A *process definition* is presented as "A horizontal sequence of activities that transforms an input (need) to an output (result) to meet the needs of a customer or stakeholder" (Palmberg, 2009, p. 207). When it comes to a *definition of process management*, two different movements are identified. The first movement (A), focusing on the management and improvement of single processes, is summarized as: "A structured systematic approach to analyze and continually improve the process" (Palmberg, 2009, p. 210). The second movement (B) shares a more holistic view on process management as a part of managing the whole organization and is defined as: "A more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness" (Palmberg, 2009, p. 210).

## 1.2 Purpose and results of implementing process management

The purposes found in the literature review of implementing process management (Palmberg, 2009) include: to remove barriers between functional groups and bond the organization together (Jones, 1994; Llewellyn & Armistead, 2000); to control and improve the processes of the organization (Melan, 1989; Pritchard & Armistead, 1999; Biazzo & Bernardi, 2003; Sandhu & Gunasekaran, 2004); to improve the quality of products and services (Melan, 1989; McAdam & McCormack, 2001; Sandhu & Gunasekaran, 2004); to identify opportunities for outsourcing and the use of technology to support business (Lindsay *et al*., 2003; Lock Lee, 2005); to improve the quality of collective learning within the organization and between the organization and its environment (Bawden & Zuber-Skerritt, 2002); to align the business process with strategic objectives and customer needs (Lee & Dale, 1998); and to improve organizational effectiveness and improve business performance (Jones, 1994; Elzinga *et al*., 1995; Armistead *et al*., 1999).

Sentanin *et al.* (2008) presents a case in a Brazilian public research center where the purpose of implementing process management was to understand its core processes in order to continue operating effectively and gaining competitive advantage. A survey from manufacturing plants in the USA shows that process management is one of the core quality principles that have significant impacts on quality (Zu, 2009).

Armistedt and Machin (1998) present a description of the adoption of process management at Royal Mail, UK, where the driver was declining market shares and dissatisfied customers and employees. The result described was that the process view allowed for a genuine understanding of what quality is from the viewpoint of the customer, and that the employees in the operations understand where they fit (Armistedt & Machin, 1998).

The results achieved from implementing process management in a Swiss bank are described by Küng and Hagen (2007) as reduced cycle time, increased output per employee, and increased quality of work products. Process re-engineering and management logic and techniques are used as enablers for the successful introduction of one-stop shops in a number of Italian municipalities; the approach resulted in reduced throughput times and a single interface with entrepreneurs was established and empowered (Ongaro, 2004).

Empirical research at Volvo Cars between 1994 and 2000 (Hertz *et al.* 2001) describes the results of the work with process management as decreased inventory cost, shorter lead times, increased delivery precision, and higher customer satisfaction. Forsberg *et al*. (1999) found, based on a survey of the application of process management in Swedish organizations, that the introduction of process management gave positive results in the following areas: common language, cooperation, customer orientation, cost, lead time, learning abilities, holistic view and standardization.

Findings similar to those of Forsberg *et al*. (1999) have also been reported by Garvare (2002). Telephone interviews with managers of 62 Swedish small and medium-sized enterprises revealed that in their opinion the general response from the personnel when implementing process management had been positive or very positive. A majority of the respondents claimed that since the introduction of process management their company had improved its financial result, recognized increased customer satisfaction, increased its customer base, become more efficient and had reached a higher level of delivery accuracy. The main problem areas due to the implementation of process management included bureaucratic documentation procedures and difficulties when trying to involve older personnel and middle managers.

DeToro & McCabe (1997) state that a change towards process management requires not just the use of a set of tools and techniques, but a change in management style and way of thinking. According to Rentzhog (1996), the implementation of process management includes both structural and cultural changes to the organization.

## 1.3 Process maturity models, organizational structures and roles

Several models of process maturity have been described in the literature; see examples in Table 1. Sentanin *et al.* (2008) present a maturity model developed by Goncalves (2000), describing five stages (A to E) of companies moving towards a process-based organization, from a strictly functional model to a stage essentially based on processes (the original article has not been used because it is written in Spanish). Sentanin *et al.* (2008) use this model to identify the process maturity level of their case, a Brazilian public research center that is placed in the second stage (B).

The second process maturity model is presented by Lockamy & McCormack (2004), describing the stages from an ad hoc to an extended maturity level. The third model is based on empirical research at the Swedish car company Volvo between 1994 and 2000 (Hertz *et al.* 2001). Hertz *et al.* (2001) present a three-level model combining the orientation (production, cost, and network) with the organizational focus (functional, project, and process).

**Table 1 - Process maturity models.**

| **Goncalves (2000) in Sentanin *et al.* (2008, p. 485)** | **Lockamy & McCormack (2004, p. 275)** | **Hertz *et al.* (2001, p. 138)** |
|---|---|---|
| **Stage A:** No decisive steps towards a process-based organization. Can only perceive their manufacturing/core process. | **Ad hoc:** Processes are unstructured and ill defined. Organizational structure is based on traditional functions. | **Production orientation/Functional organization:** Focus on labor productivity, delivery to stock, and product quality. |
| **Stage B:** Identified processes and sub-processes, but focuses on functions. Started reducing bottlenecks. | **Defined:** Basic processes are defined and documented. Organizational structure includes a process aspect. | |
| **Stage C:** Identified and improved core processes. Functional mentality with power in the functional units. Might add technology to core processes and eliminate non-value-adding activities. | **Linked:** Process management is employed with a strategic intent. Broad process structures are put in place outside traditional functions. (Breakthrough level) | **Cost orientation/Project organization:** Focus on delivery speed, TQM and process reengineering. |
| **Stage D:** Distribution of resources in core processes. Appointment of process owner responsible for managing each core process. Traditional organizational structure. Success in improving isolated processes. | **Integrated:** Organizational structure is based on processes; traditional functions begin to disappear. Process measures and management systems are deeply embedded in the organization. Cooperation with suppliers and customers on process level. | |
| **Stage E:** Organizational structure designed based on the logic of core processes. | **Extended:** Multi-firm networks with collaboration between legal entities built on trust and mutual dependency. | **Network orientation/ Process organization:** Focus on speed and precision, customer satisfaction and network effectiveness. |

The first two maturity models by Goncalves (2000) in Sentanin *et al.* (2008) and Lockamy & McCormack (2004) argue for a full transition from a traditional functional organization (Stage A or Ad hoc) to an organization fully based on the processes (Stage E or Extended); see Figure 1 and the

transition all the way from Stage I – A strictly functional organizational structure – to Stage III – A strictly process-based organizational structure.

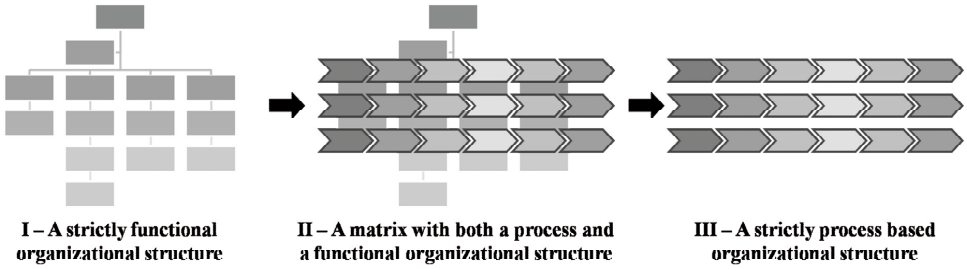


**Figure 1 - Three different organizational structures from a strictly functional organizational structure (Stage I) to a matrix structure with both a process and a functional organization (Stage II), and finally a strictly process-based organizational structure (Stage III).**

Hertz *et al.* (2001) describe a conflicting, more moderate transformation, where a process management structure is "matrixed onto" the existing organization, as in Stage II – A matrix with both a process and a functional organizational structure – of Figure 1. In the same line of reasoning, Ongaro (2004) concludes that process management should not be seen as a question of all or nothing, but as a continuum between better process-related knowhow of the employees to an organizational and technological solution. Also supporting a more moderate line ares Küng & Hagen (2007, p. 86), who state that: "Process management does not entail the absence of traditional hierarchical relations […] Process management usually leads to a matrix framework".

Hammer and Stanton (1999) argue that most companies overlay new processes on established functional organizations, with possible negative consequences since the traditional organization – with job definitions, performance measurement systems and managerial hierarchies – do not always support the performance of processes. Hammer (2007) states that the horizontal processes pull people in one direction, and the traditional vertical management system might pull them in another.

There is possibly a danger if working too hard on building a prominent process management structure within an organization, a new hierarchical structure, going horizontally through the organization instead of top-down, could be created. Silvestro and Westely (2002) present an analysis of functional and process structures and conclude that both structures have both benefits and limitations.

A similar discourse can be seen in the area of roles and responsibilities. On the one side, Ongaro (2004) argues that the process owner must have authority over process aims and staff resources. On the other side, Hertz *et al.* (2001) identify process managers without formal authority. Hammer and Stanton (1999) argue that the process owner has to be a permanent role and must have the responsibility for and authority over; designing the process, measuring its performance, and training the frontline workers.

From the case of a Brazilian research center, Sentanin *et al.* (2008) present a reason for resistance to a process organizational structure among managers, as they lose authority and power as well as their financial losses caused by the reductions of hierarchical levels in the organization. The same line of reasoning is presented by Hammer and Stanton (1999) who argue that it is usually senior functional

executives who are the biggest opponents to process management because of their loss of autonomy and power.

Another type of maturity model is presented by Hammer (2007) who describes the features of process enablers and enterprise capabilities. The process enablers determine how well single processes are able to function over time, and are presented as; design, performers, owner, infrastructure and metrics (Hammer, 2007, p. 113). Organizations that are able to put the enablers in place are described to possess enterprise capabilities, presented as; leadership, culture, expertise, and governance (Hammer, 2007, p. 113). Further, Hammer (2007) presents four levels of maturity within each enabler and capability. In a earlier paper Hammer and Stanton (1999) presets the infrastructure of the process enterprise to be; measurements, compensation, facilities, training and development, and career paths.

As presented above, there are several possible perspectives to be used when studying the implementation of process management in organizations. The focus of this study, as stated earlier, is the organizational structure, roles and responsibilities – corresponding to the enabler "owner" and the capabilities of "leadership" and "governance" according to Hammer (2007).

# 2 Methodology

The purpose of this paper and study is to explore and describe the implementation of process management in order to increase understanding among practitioners and researchers. A case study approach is used, as it is an empirical inquiry that investigates a contemporary phenomenon within its real-life context (Yin, 2003).

## 2.1 Purposeful selection

The selection and execution of the case studies were made in collaboration with a study examining organizations using the SIQ Model for Performance Excellence as a tool for quality improvement (Eriksson & Garvare, 2005). A multiple-case strategy was used to get a more extensive picture of how the organizations have worked with process management.

Both managers and employees have been chosen as informants. The managers have foremost been those responsible for the process management initiative. The employees have been selected based on recommendation from the managers because it eases the sampling process, but with the awareness of risk of bias. This is a kind of triangulation in social sciences described by Johannessen & Tufte (2003) as looking at a phenomenon from different perspectives.

## 2.2 Data collection

The primary sources for data collection in these studies have been interviews and observations. This choice was made on the basis of wanting to hear the "stories" of the organizations, and wanting to hear these stories from different angles. Before each study, the organizations were contacted and agreed to participate in the study. A date was set for the visit and the organization received information about the areas that would be investigated. The interviews were prepared through tests of the questions with colleagues. Case study protocols, stating what areas to investigate and questions to ask, were used to ensure that the same procedures were followed at all the organizations. This strengthens the reliability of the study, according to Yin (2003).

Semi-structured interviews were conducted with representatives from different hierarchical levels, both managers responsible for the work with process management, and employees who had been

involved in the work. The visits to the organizations were extended to one day, which gave time to observe and understand the environment in the organizations.

In addition, Organization C has been closely examined over a period of two years following the multiple-case study. For a period of three months in 2003 and between September 2004 and February 2006, I was partly positioned at the company, actively participating in the development of their process management work through action research. This is important, as it enables access, collection, analysis, and validation of empirical material.

## 2.3 Data analysis

When conducting data analysis, Yin (2003) suggests that there are two general strategies when approaching the material: relying on theoretical propositions, and developing a case description. In this paper, case descriptions were developed (see the next section) as a means of presenting the material for the readers. The case descriptions are based on transcripts of the interviews and notes from observations. Coding has been used in the text analysis, with codes that evolved during the work (Miles & Huberman, 1994). The case descriptions have been analyzed using the frame of reference presented in the earlier sections with results from previous, mainly empirically based, research. A summary of the analysis is presented in Table 2.

# 3 Results – case descriptions

## 3.1 Organization A

Organization A is a logistic company owned by the organizations whose products they are transporting. In 2003, the turnaround was almost 1700 million Euros and they had about 400 employees in Sweden. In 1994, the company was the first organization in their branch of trade that received an ISO 9001 certification. At the time of the study, they had a market share approaching 50 per cent.

### 3.1.1 Incitements and Implementation

Already in 1994, the company started working with the criteria of the Swedish Quality Award, which includes parts of process management. In 1996, a new CEO was hired who had previously been working with process management in other organizations.

> The new CEO was the catalyst [for process management], she brought the toolbox.
> *Process leader, Organization A*

The reorganization that followed was initiated by declining sales and a new owner who demanded improved results. The reorganization was carried out with the help of external consultants who worked with the top management team, but who also held workshops with middle management and employees on a team level. According to one of the process owners, the existence of slack in the organization has been important since it provided openings for improvement work and learning.

### 3.1.2 Organizational structure

Since 1997, there had been a cross-functional process organization present in parallel with the old functional organization. In the process organization the *process owner* was working with different flows through the company, and the functional managers were responsible for budget and staff.

> Process owner used to be a bit of an honorary title, with no large responsibilities, given to those who worked in the process and was very engaged. These process owners did not have that much power; the power still lay within the functional organization.
> *Process leader, Organization A*

In 2000, top management at Organization A reached to the conclusion that it would be better to work the opposite way, and a new reorganization was initiated. Two years later, this reorganization had led to the following organizational structure: the head of the department is also the *process owner*, responsible for staff, budgets and process performance. One of the interviewed said that: "it was new titles, but no new people". This gave the process owners more responsibility, with higher demand from the top management. One positive factor mentioned with the reorganization was the clarification of responsibilities.

> The organization has given the responsibility to one person to avoid that work made on many different, but parallel tracks, with different agendas. […] You do not [have to] discuss who should be doing what.
> *Process leader, Organization A*

Under each process owner there are now *team leaders* responsible for the personnel, and *process leaders* responsible for the development of the processes. The process leaders act as facilitators within the department and the groups when working with improvement. There are, however, some adjustments between the different departments that mainly depend on the size of the department.

To aid the process leader in the work with improvements, there are also *process improvement teams* with employees from different parts of the department. These groups are given some theory background and they become a forum for improvement. The members have been recruited to the group through recommendation or by application.

> There has to be someone who grabs hold of the ideas and makes them happen. Now we have the process improvement groups which do that.
> *Member of a process improvement group, Organization A*

### 3.1.3 Effects

According to the interviewed, the process orientation in Organization A had several effects on the company. The strategic understanding of the business increased because of the process approach. One of the employees described how before the change, one could blame someone else when things went wrong, but how there was now a shared responsibility and also much stricter economic control. The process orientation also increased the mutual understanding between co-workers of different departments, and there was a desire to deepen that understanding by performing an internship at other departments.

A majority of the employees found the work with process management to be a positive experience, but the increased productivity control that followed was causing stress for some of the employees. It had become easier to drive improvement when working in a process organization. However, according to one of the process owners, it had also become more difficult to build commitment among employees.

One of the interviewed suspected that the organization might be losing some of the links across the company when working with process management:

> There can be a bit of sub-optimization of the staff. The different business areas keep their own staff who can be working in parallel with someone at a different business area.
> *Process leader, Organization A*

The reorganization towards process management led to few changes at the team and team leader levels of the company:

> This does not change our assignments. My group leader is still the same, and neither did nor do we now see much of the management above him. […] We do not notice that much difference; it does not change our tasks.
> *Employee, Organization A*

## 3.2 Organization B

Organization B is an energy producer owned by a larger European energy group. In 2003, the turnover for the company was 200 million Euros and they had about 100 employees.

### 3.2.1 Incitement and implementation

The process orientation at Organization B started when one of the top managers attended a seminar about process management and found it to be interesting.

> We started working with process management because we wanted to develop the organization, not because of [external] pressure or crisis.
> *Process owner, Organization B*

In the middle of the 1990s, the company took on working with the Swedish Quality Award. In 1999, a new CEO was appointed and the company went through a major reorganization. The implementation of process management took place through seminars and workshops with all employees, assisted by external consultants. The process owners and process leaders, who all came from the old organization, attended courses in process management, leadership, and personal development.

### 3.2.2 Organizational structure

To start with there were *process leaders* appointed in the organization, but soon they were renamed *process owners.* These persons were the old department managers who got new titles and became responsible for the operations and performance of the processes of the company. New *competence owners* were appointed, responsible for the personnel.

> Some employees are working in three or four different processes with different process owners. Therefore it is important that the competence leader takes the whole responsibility for the individual.
> *Process owner, Organization B*

After the reorganization the process owners categorize the competence they need for their processes and demanded this competence from the competence owners.

At Organization B there were now again *process leaders*, which reported to the process owner and were aided by *improvement teams*. The teams sometimes included representatives of the customers. The position of a process leader was not defined within the organizational chart.

> It is a bit difficult to find the relationship between the different positions. […] The answer about our organizational structure depends on who you ask in the organization.
> *Process owner, Organization B*

### 3.2.3 Effects

According to employee surveys, there has been an increase in well-being among the employees as a result of the work with process management.

> The work with process management could be a way to achieve commitment from everyone.
> Process owner, Company B

The new organizational structure has allowed a more effective use of employees. The process orientation has also given a better general picture. Both process owners and process leaders indicated that it was hard work to make the new organizational structure work. One frustration was mentioned, where some of the employees had wanted clearer commands about what to do.

> There is no one telling you what to do when you get to work in the morning. […] In the beginning it was hard to know who to ask about what in the organization.
> *Process leader, Organization B*

A downside discussed by both the process owner and the process leader is sick leave due to stress caused by the larger responsibility put on each individual in the new organizational structure.

> Working in an organization of process management demands a lot of the individual, to take own initiatives. There is no one telling you what to do. […] This way of working does not suit all people.
> *Process leader, Organization B*

The process leader argues that the number of sick leave days is clearly higher after the organizational restructuring.

## 3.3 Organization C

Company C is a wholly owned subsidiary of a larger Swedish insurance organization. It has about 150 employees who serve 360 000 customers. The turnover in 2003 was about 90 million Euros and the market share was about 60 per cent. In 1998, Organization C was the first insurance company in Sweden to receive an ISO 9001 certification.

### 3.3.1 Incitements and implementation

In 1992, a new CEO was appointed at Company C. Three years later he set up a goal: the company shall grow 25 per cent while saving 25 per cent on total costs. As a part of its strategy to reach this goal, Company C started working with the Swedish Quality Award. As a result, process management became a part of Organization C's quality improvement efforts.

### 3.3.2 Organizational structure

At Organization C, a matrix model has been used when organizing for process management. *Process owners* have been working full time improving the performance of the processes at the company. These process owners have all been recruited from within the organization.

> There have not been any exact calculations on the profile for being a process owner; there is a slightly different focus in the different processes.
> *Former process owner, Organization C*

The full-time arrangement for process owners was a later development. In the beginning, all process owners worked part time with the process manager matters and part time with their old settings. The

process owner then has a *process developer* at hand when working with specific problems. Later, this role disappeared.

There have been some different turns on the way the organizational structure is presented at the time of the study. Earlier, the process owners of the core processes had been working full time with the processes, while the support process owners had been the old functional managers from the support departments, which had only been working part time with the management of process performance. In the fall of 2004, the five part-time support process owners were replaced by one full-time support process owner for all the support processes.

> Those of us who work in the matrix are in control of it. But it can be a challenge to explain the structure for the employees. […] The organizational structure, it depends on who you ask what picture you will get.
> *Process owner, Organization C*

In the other dimension of the matrix there were *functional managers* who had the responsibility of the results and the employees. *Team leaders*, responsible for coaching the employees, were placed below the functional managers.

> A team leader is working in the operations with a perspective of a couple of months. My task as a process owner is to have a more strategic picture. I am responsible for the system, not the staff, and I have more of a development perspective.
> *Process owner, Organization C*

The management at Organization C has tried to take the organizational restructuring one step further and form mixed, autonomous teams. The idea has been to mix employees from different market areas, and thereby have them work in the same way. However, this idea turned out to be difficult to realize, and therefore the organizational structure went back to specialized teams. The employees had a need to be placed close to those working in the same area to be able to efficiently transfer knowledge.

> We were mixed teams with a combination between different competences. We did not connect or work across the borders in those groups so now we are back in our specialized teams. It is good because now my manager knows about the things that I do.
> *Employee, Organization C*

### 3.3.3 Effects

Before the process orientation, the different market areas had been working in different ways. One of the biggest gains of the work with process management was, according to the former process owner, that a unified way of working at Organization C was developed, a way of working that was not dependant on which market area was looked at. The standardization of work procedures has been an important contributor to the cost savings achieved. The goal of 25 per cent growth with 25 per cent reduction in cost was reached in 1999, four years after it was set.

> Our work got more systematic, we documented what we were doing and structured it. It got obvious all those not important things we where doing.
> *Former process owner, Organization C*

One place where conflicts still occurred at the time of the study was in the matrix, where the process owner is responsible for how the operations are run, and the functional manager is accountable for the result. However, in Organization C, many people describe this as a dynamic which has been a positive and contributing part of the success.

> Process management has made it clear what should be delivered to the customer. To produce what the customer wants you have to calculate the activities and processes you need to accomplish that. […] Customer focus has got a deeper meaning. It got obvious that my process delivered something directly to the customer.
> *Former process owner, Organization C*

According to the interviewed, there was a risk in the new structure that some individuals could take on too much responsibility, more than they had time for.

# 4 Analysis

The analysis has been guided by the purpose and research questions of the paper, by earlier empirical results described in the introduction, and by the empirical material of the studied cases. The analysis has been performed on an organizational level, not on the individual level. A summary of the cases, using the initial questions posed in the introduction as variables, is shown in Table 2.

## 4.1 Changes on organizational structure, roles and responsibilities, and the experienced results

All three organizations have chosen to implement some kind of matrix-organization, saving parts of the old functional structure, and then adding new positions to a process overlay superimposed on this structure. The organizations have chosen different paths when implementing the process overlay. All three have used internal recruitment for the positions as process owners, but have given this position different status and responsibilities.

The role of giving day-to-day support to staff has principally been kept by the team leaders or competence leaders in Organization B. This role had seldom been affected by the reorganizations, even though there had been changes of role names and titles. Daily support and direction were given to the employees by their immediate superior, regardless of organizational type.

The different paths the companies have taken seem to have delivered different results. When, as was the case in Organizations A and B, functional managers with a long history within the organization enter the role as process owners, there is a risk that little really changes. On the other hand, there can also be difficulties when appointing other persons as process owners, as was the case in Organization C and also initially in Organization A. Inexperienced managers can have difficulties with legitimacy and authority towards the more senior functional managers, leading to the status of the process organization becoming lower that that of the functional organization. To try to prevent this, strong support has to be given from the top management to the process owners so that they have the knowledge and authority to stand up to the functional managers.

According to the process maturity model by Goncalves (2000) presented in Sentanin *et al.* (2008), all three organizations studied meet the requirements of Stage C of having identified and improved their core processes. Organization A and B could be categorized as having a functional mentality (Stage C), where the old functional managers have been renamed process owners. Organization C has appointed new process owners that exist in parallel to the functional organization, and can therefore be placed in Stage D.

**Table 2 - A summary of the case studies of Organization A, B and C.**

| | **Organization A** | **Organization B** | **Organization C** |
|---|---|---|---|
| ***Purpose of process management*** | – Initiated by declining results and demands for improved results from new owner | – Wanting to develop the organization, not because of [external] pressure or crisis | – Aiming for 25 per cent growth and 25 per cent saving on total cost |
| ***Organizational structure*** | – Process organization in parallel to functional organization | – Process and competence organization instead of functional organization | – A matrix of functional organization and process organization |
| ***Roles and responsibilities*** | First approach:<br><br>– *Process owners:* working with flows throughout the company, an "honorary title"<br>– *Functional managers:* budget and staff<br>Second approach:<br><br>– *Functional manager* also *process owner*: responsible for staff, budget and performance. In each department:<br><br>– *Team leaders*: responsible for staff<br>– *Process leaders:* responsible for development of processes, facilitating *process improvement groups* of employees | – *Process leaders*, soon renamed *process owners*: former department managers with new titles, responsible for operations and performance of processes<br>– *Competence owners:* responsible for personnel, the whole individual<br>– *Process leaders:* reporting to process owner, aided by *improvement teams* that might include customers | First approach:<br><br>– *Functional managers*: responsible for results, budget and staff<br>– *Process owners*: working part time on improving the processes<br>– *Process developer*: part time, supporting the process owner on specific problems<br>Second approach:<br><br>– *Functional managers*: same as above<br>– *Process owner*: full time, without process developer. Responsible for how operations are performed and long-term development<br>– *Team leaders*: coaching employees day to day, short perspective |
| ***Changes at team level*** | – Very few changes at team level | – N/A | – Autonomous teams were tested with mixed employees from different market areas with the objective of aligning procedures, and the ability to learn from each other<br>– Difficult to realize because of the need to be placed closely with those working with the same products to share knowledge<br>– Back in specialized teams |

| | | | |
|---|---|---|---|
| ***Experienced results of process management*** | – Increased strategic understanding<br>– A shared responsibility<br>– Sharper economic control<br>– Increased understanding between co-workers from different departments<br>– Easier to drive improvement | – A more effective use of employees<br>– A better general picture | – A unified way of working between market areas, standardization of work procedures enabled the targeted cost savings<br>– Increased customer focus – clear what should be delivered to the customer |
| ***Experienced effects on structure and roles*** | – Second approach resulted in clarification of responsibility<br>– The responsibility is given to one person to avoid parallel agendas and work<br>– Risk of sub-optimization of staff with separated responsibilities between business areas | – Sometimes difficult to find the relationship between different positions<br>– Answers about organizational structure depend on who you ask in the organization | – The matrix between functional and process organization is difficult, but creates a dynamic<br>– Those working in the matrix are in control<br>– It is experienced as a challenge for employees to understand it<br>– Answers on organizational structure depend on who you ask in the organization |
| ***Experienced effects for individuals*** | – A majority of employees find work with process management positive | – A raise in well-being in employee surveys<br>– Frustration, requesting clearer commands<br>– Increase in sick leave due to stress caused by larger responsibility for each individual | – A risk in the new structure that some individuals take on too much responsibility |

The process maturity model of Lockamy and McCormack (2004) places all three organizations into the third "Linked" stage, where process management is employed with strategic intent, and process structures are put into place outside the traditional functions. None of the three organizations reaches the higher levels of the first two process maturity models.

This could be interpreted as supporting the argument that process management is not all or nothing (Ongaro, 2004), does not require the absence of a functional organization (Küng and Hagen, 2007), and that a process structure can be matrixed onto a functional structure (Hertz *et al.,* 2001). See Stage II in Figure 1.

Another supporting argument for the matrix structure can be found in Organization C when testing mixed teams based only on the process structure, leaving the functional structure of the market areas. It was difficult to develop the mixed teams because of the need to be placed closely with those working with the same functional responsibility and specialty. This might be interpreted as an indication of the need to keep a functional structure while, at the same time, adding a process structure to the organization.

However, in all three studied organizations there seems to be a challenge to find a balance in the matrix between the functional and process perspective. Organization B describes it as difficult to find the relationships between different positions. Organization A has chosen a path where the complexity is reduced when both perspectives of the process and the function is gathered in one position. Some of the interviewed state that this has resulted in a clarification of responsibility, but also in a risk of staff sub-optimization when the managers do not work closely together between departments.

Organization C describes the matrix as difficult, but also as contributing with a constructive dynamic. In the beginning of implementing process management, one of the process owners loudly claimed the difficulties as a process owner being responsible for the operations without having the responsibility or authority over budget and staff. After two years he was one of the strongest promoters for the matrix structure. He then argued that the discussions he was forced to have with the functional managers (responsible for budget and staff) made them reach better decisions together than if one of the perspectives (process or function) dominated.

This is in line with Hammer and Stanton (1999) who argue that the matrix structure separates the control over work from the management of the people who perform the work. Further, they state that this split of authority makes cooperation unavoidable. "Traditional styles of management, to sum up, have no place in a process enterprise. Managers can't command and control; they have to negotiate and collaborate." (Hammer & Stanton, 1999, p. 114)

# 5 Summary and conclusion

It seems that all three organizations have found ways to use process management not just as an approach for improving single processes (movement A in Palmberg, 2009, and the process enablers in Hammer, 2007), but also as a perspective for managing the whole organization (movement B in Palmberg, 2009, and the enterprise capabilities in Hammer, 2007). The purpose of this paper is to explore and describe the organizational implications of implementing process management. The results will be summarized below.

*What was the purpose and what were the results of implementing process management?* To summarize, there seems to be almost as many purposes of implementing process management as there are organizations attempting it. The results found in the three studied organizations cover:

- increased understanding among employees of strategies and customer needs;
- standardization of work procedures, enabling cost savings;
- more effective use of employees;
- sharper economic control; and
- easier to drive improvement.

*What are the effects experienced by individuals when implementing process management?* People at the organizations studied express an increase in well-being and that the employees find the work with process management positive. But this is combined with a concern about the risk of stress caused by increased individual responsibility among employees.

*How is the ability to drive improvement affected when implementing process management?* In all three organizations, the process organizational structure, with process owners and process leaders as facilitators and process improvement teams of employees driving change, has strengthened the organizations' capability to change and improve.

*How are organizational structures, roles and responsibilities affected when implementing process management?* All three studied organizations have introduced a process management structure into their functional organizational structure, including the introduction of new management positions such as process owners and process leaders. The relationships between the process organization and the functional organization differ between the three organizations, but all match Stage II in Figure 1.

# 6 Discussion and implications

There appears to be a conflict when the old functional and more hierarchical structure, where you are told what to do, meets the new process organization, where the individual has a larger responsibility for taking his or her own initiatives. The companies question it if it, for those who like to take on challenges, presents too many opportunities. It is also reflected upon whether this way of working does not suit everyone or if it is a question of the individual having the right support to handle the new responsibility.

In the introduction of this paper, two different discourses were identified. On the one hand, a full transformation from a functionally orientated organizational structure (Stage I in Figure 1) to a fully process oriented organizational structure (Stage III in Figure 1) is favored; on the other hand, a more moderate transformation where a process management structure is "matrixed onto" the existing organization is preferred (Stage II in Figure 1). The analysis of the three studied cases could be interpreted as supporting the second line of reasoning, where the functional and process structures co-exist in the organization, creating a constructive dynamic. The implication of this line of reasoning is that complexity is created rather than reduced in the organizations to handle the need of several parallel perspectives on the business. How to manage complexity instead of reducing it could be seen as a challenge for the management of contemporary organizations.

This is in line with Silvestro and Westley (2002) who promote the matrix structure because of its relative strengths of both the horizontal and vertical structure. But, they also highlight the risk that the

matrix structure becomes complex and unwieldy. They suggest that viewing the organization as a network of activities may be more realistic than the matrix.

The contribution of this article is two folded. First, the empirical descriptions and analysis of the three organizations that have implemented process management. This contributes to the knowledge and understanding among both practitioners and researchers. Second is the identified need for the co-existence of a process and functional perspective, and the implication that complexity is created rather than reduced in the organizations.

The implication for practitioners could be interpreted as instead of trying to control the functional and process structure separately, the challenge is to collaborate and negotiate between the functional and process perspective. To put it in another way: the solution is not functional *or* process management, but functional *and* process management. It could be suggested that this calls for improved management approaches within areas such as leadership and culture. For example, Organization C gather all their managers, one day a month, to discuss current issues together, with the objective to unite and align managers from different perspectives. This is an example of creating an arena for negotiation and collaboration. See further descriptions of approaches from Organization C in Palmberg and Garvare (2006).

The implication for researchers could be the indication of a need to further explore the issues of managing complexity, as a suggestion in relation to the knowledge of complex adaptive systems. A suggestion for future research is to further explore the relationship between the functional and organizational perspective, and structure in organizations working with process management, both empirically and theoretically. A suggestion is to use the framework of Hammer (2007) to further investigate empirical cases. Possibly with an interactive research approach where the researcher work with the management team of the organization under study, including process owners, and coaches the organization to increase their process management maturity according to the framework, while simultaneously exploring their process management initiative.

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## PAPER 3

# Sustained quality management: how to receive the Swedish quality award twice

Palmberg, K. & Garvare, R.

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# Sustained quality management: how to receive the Swedish quality award twice

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## Abstract

**Purpose** – The purpose of this paper is to describe how Agria Animal Insurance Sweden (Agria) has organised its quality-related work through a sustained and systematic focus on basic elements of quality management such as value focused leadership, employee involvement, process management and control, customer focus, and continuous improvement.

**Design/methodology/approach** – The study has been based on interviews, document studies and action research. It is a single case study design with limited intentions of generalisation.

**Findings** – The analysis shows that the top management at Agria has been a strong driving force that has effectively united leaders at all levels as agents of change. Additional success factors have been the deployment of basic values, the "five always", and the value focused leadership. Further on the company has succeeded in creating a cultural basis and structures for systematic work with improvements.

**Practical implications** – A way to address corporate culture in order to open up for a climate of micro improvements of practice within present routines is illustrated in this paper.

**Originality/value** – Agria could be considered an example for others to study and get inspired by when working with quality-related issues.

**Keywords** Quality management, Quality awards, Organizational culture, Insurance companies, Sweden

**Paper type** Case study

## Introduction

In December 2003 Agria became the first company ever to receive the Swedish Quality Award twice. This noticeable success was the result of a change process that begun about ten years ago. Why has Agria succeeded in implementing a total quality management (TQM) programme that has been sustainable for such a long period of time? This question was the starting point of a research project that commenced in 2002 and is still in progress. The purpose of this paper is to describe how Agria has organised its work for quality management.

Concepts, such as TQM, process management and self-assessment, have been the subject of discussion among management academics for several years. There have been many reports of a positive relationship between the adoption of TQM and improved performance of organisations, see, for instance, Easton and Jarrel (1998), Hendricks and Singhal (1997) and Reed *et al.* (2000). However, despite the enthusiasm for TQM among organisations, the efforts of implementation have often faced unexpected problems. Many organisations have tried to implement these methodologies, but not all have succeeded, see, for instance, Dale *et al.* (1997), Edwards and Sohal (2003), Garvare (2002) and Haupt and Whiteman (2004).

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According to Edwards and Sohal (2003), one of the criteria for the success of TQM programmes is the sustainability over time. Implementing TQM means a long-term commitment and a considerable investment of resources. A lasting positive outcome of such an investment should be of the highest importance to any organisation.

As stated by Eriksson (2004) a common proxy for a successful implementation of TQM is the reception of a quality award. Several case study findings indicate that if the goal is to get lasting results, it is not sufficient to participate in a quality award process only once. Instead one should participate in the process several times, with enough time in between the applications in order to complete as many as possible of the improvement projects resulting from the evaluations (Eriksson and Garvare, 2005). The fact that Agria has received the Swedish Quality Award twice led us to believe that a study of this organisation could indicate some factors that are characteristic of successful TQM programmes, and hence be of general interest.

## Research methodology

In 1999 Agria received the Swedish Quality Award for the first time. This was the reason for the researchers' awareness of the quality-related activities, which had taken place in the company, and also the origin of the first contact. The research question of interest in this project is why Agria has been able to successfully implement a TQM programme that has been sustainable over such a long period of time. There are several possible research strategies plausible for answering this question, such as, for instance, literature reviews, face-to-face interviews and mail surveys with questionnaires. Yin (2002) argues that the choice of research strategy should be based on the type of research question posed, the control an investigator has over the events, and the degree of focus on contemporary as opposed to historical events.

In this study the degree of control has been negligible. The purpose was to describe both contemporary and historical events, and the research question is "why" a certain implementation has worked so well. Therefore, the methodology employed for this study has been mainly qualitative, with semi-structured interviews, see Merriam (1994), and direct observations as primary tools for data collection. Over a period of two years, the researchers have visited the company several times and have conducted interviews with both managers and other employees. The focus of these interviews has been to get a deeper understanding of how the mechanisms behind the quality-related issues function in the organisation. The interviews were documented using tape recordings and notes made during the discussions. To gain further insights, relevant internal and external company documents and reports, such as annual reports, descriptions of the company on the basis of the criteria for the Swedish Quality Award, and feedback reports from the award process, have also been investigated.

For three months in 2003 one of the authors was positioned at Agria, carrying out the study in the form of action research; see, for example, Stinger (1999) for a description of this methodology. In this part of the study she participated actively in the improvement efforts performed at the company. This was important as it enabled collection, analysis and validation of empirical material in a cyclic and iterative manner. She also got the opportunity, in the fall of 2004, to take part in the training that is provided to all new employees at the company.

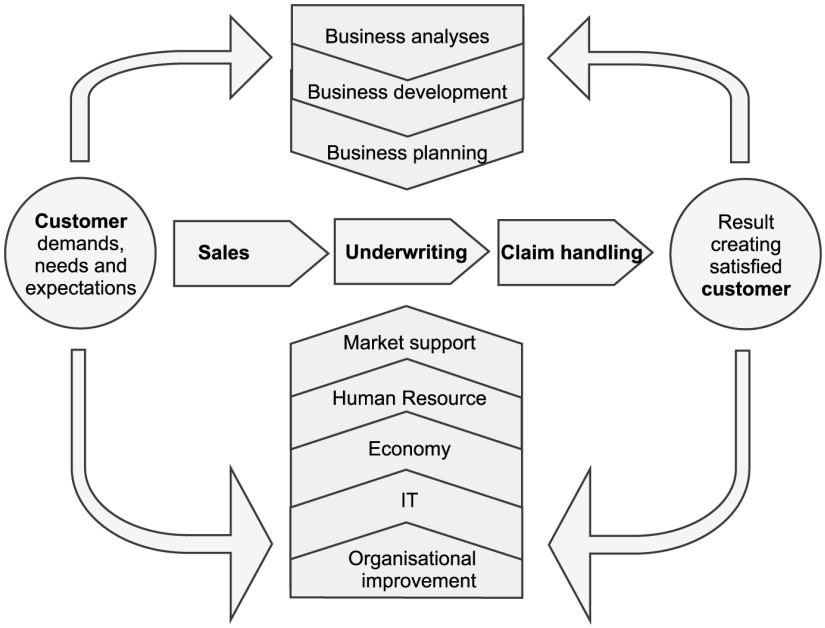
The data collected has been analysed repetitively in discussions in the research group, by looking for patterns in the material and by iterative testing of tentative

hypotheses. The presentation of the case study has been structured according to a set of management principles used in the analysis of the data material: customer focus, value focused leadership, employee involvement, process management and control and continuous improvement.

## Company description

Agria is a wholly owned subsidiary of the Swedish insurance company Länsförsäkringar AB and has specialised in the provision of animal and crop insurance. Länsförsäkringar AB and its subsidiaries are jointly owned by 24 mutual companies. Agria has about 130 employees, who together serve about 360,000 customers. The premium incomes for 2003 were about €77 million and the market share was about 62 per cent of the total market in the animal and crop insurance segment in Sweden.

Agria is divided into three business areas: small pets, horses and agriculture. In addition to these areas Agria also has a process organisation (see Figure 1). The core processes of Agria are: sales, underwriting and claim handling. They are supported by a number of business support processes, such as: market support, human resource, economy, information technology and organisational improvement. The purpose of the strategic processes (business analyses, business development and business planning)




**Note:** The strategic processes at the top and the business support processes at the bottom give direction and support to the business processes, which are shown in the row in between

**Source:** Agria (2004)

**Figure 1.**
Agria's process map

is to ensure the company's future development and results. The stated mission of the company is to "use expertise and commitment in order to develop and sell security for animals and people".

In 1998, Agria became the first Swedish insurance company to receive an ISO 9001 certification. The same year Agria participated in the Swedish Quality Award for the first time, and one year later the award was received. Some of the milestones in Agria's work with quality are:

- 1995: The criteria of the Swedish Quality Award are studied by the CEO and presented to the top management group.
- 1996: Agria starts working with projects on process orientation and implementation of structures for continuous improvement.
- 1997: Agria's satisfied customer index is launched.
- 1998: ISO 9001 certification and first application for the Swedish Quality Award.
- 1999: Receives the Swedish Quality Award.
- 2000: Upgrades to ISO 9001:2000. ISO 14001 certification.
- 2001: A new, process based, organisational structure is introduced.
- 2002: Certified to Investor in People.
- 2003: Receives, as the first organisation, the Swedish Quality Award for the second time.

**Quality management principles at Agria**

According to the CEO a main reason, for him, to start the work on systematic quality improvement was curiosity. He points out that the company did not begin working with the criteria of the Swedish Quality Award because of external pressure, but because of an ambition among the top management group to improve productivity in operations and reduce operating costs per business item. In the mid-1990s they were looking for some kind of instrument that could help to strengthen and improve the whole organisation. Agria was looking for a new strategy of administration and came to the conclusion that this strategy should not only be about information technology but also about new ways to develop work procedures. They wanted to strengthen their improvement efforts and their ability to adjust to changing conditions.

At this time the CEO started reading the criteria of the Swedish Quality Award. They seemed to be able to fulfil the wish of something that could structure the wanted change of the company. The CEO says:

> In order not to scare the other people in the management I selected only smaller parts of all the criteria of the Swedish Quality Award to begin with.

With the criteria of the Swedish Quality Award they started with the questions regarding business process management. Along with the work with the processes the focus on customers followed naturally, as the processes had their origin in customer demands. After a short period of time the project was enlarged to include all criteria of the award.

*Customer focus*

Agria has been recruiting on the basis of a recruitment policy involving that employees at the company should be animal owners. With a few exceptions everyone at Agria is, or has been, an animal owner. Several of the employees have a history of competing with their animals, or owning farms. This has ensured that many of the employees have an active interest in animals and also have extensive knowledge of animal care.

Agria has developed several policies and guidelines. One of them is the quality policy:

> Our customers are the ones who determine the quality of our work – everyone at Agria has customers. Our associates are the ones who create satisfied customers. Our aim of continued improvement is what increases our competitiveness.

The quality policy has had strong implications for day-to-day operations at Agria. One of the employees described, for example, a situation where she had a system crash on her computer. At the same time there was some problem with the CEO's computer. Since the employee was in a position where she had a more direct customer contact her problems were prioritised by the computer support team.

Through cooperation with its customers Agria has actively strived to investigate their operations and to create products that are adapted to animal owners' demands and needs. Some of the tools used are:

- *Agria's satisfied customer index*. Ten times a year Agria's customer service centre calls 450 customers to examine and investigate their views on Agria's operations. The result is presented to the employees as an index in internal newsletters and at monthly breakfast meetings.
- *Customer suggestion system and customer complaints*. A collection of complaints, opinions and suggestions are gathered in a database. Through this database the organisation is able to learn from mistakes and receives input to improve its operations.
- *Representatives in Agria's board*. Three out of 12 members of the board are representatives of animal owner organisations and one member is a representative of the veterinarians, Agria's most important group of suppliers. This, together with the use of product committees and a claims appeal committee, promotes close co-operation with animal organisations and the veterinarian society.

*Value focused leadership*

During the interviews the representatives of Agria's top management often expressed an ambition to spread certain values in the organisation. All new employees take part in five days of training, the "Agria school", concerning Agria's operations and values. It is spread over a month of time and is a complement to the training of each employee's own tasks. The new employees meet managers of the different business areas to learn about critical success factors in each area. In order to reach an understanding of process flows through Agria they also meet all the process owners. One and a half days are set aside for discussions of communication and also a day about the quality and environmental work at Agria. The training is followed up by regular developmental conversations each year. The competence level is determined on a four-graded scale, and if there is a discrepancy with the goals established, measures are taken to raise the

competence level of the employee. The training of the new employees is centred on the quality policy and Agria's five basic values, "Agria's five always", that are repeated in different assignments:

(1) Always make a little extra effort – to exceed customers' expectations.

(2) Always see possibilities – to help us succeed.

(3) Always improve skills – to work preventatively at all times.

(4) Always act professionally – to help us attain long-term profitability.

(5) Always show respect and trust – to help us create a good working climate.

These basic values are supposed to facilitate work and increase the opportunities of attaining set goals. A business controller, who was responsible for the process connected to the Swedish Quality Award 2003 at Agria said:

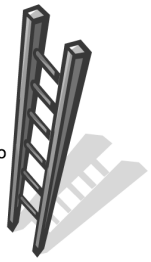
> The only things you need to know at Agria are the five always, the quality policy and the ladder of initiatives [described below], no rules. If you don't live up to the basic values then you are not considered for the salary audit and if you do something seriously in opposition to the values it can even be reason for notice of dismissal.

The basic values and the quality policy have been developed in the same way as many other things at Agria. The top management group creates a suggestion, which is presented to the employees at a breakfast meeting, a division conference or at the yearly company convention. The employees are encouraged to give feedback to the suggestion, which is then improved before implementation or establishment.

One example of how the values have been integrated in the training is in the "health game", which has been developed by employees at Agria to improve the awareness of health issues among the employees. The game is a set of different scenarios, where the participants have to take a stand. Each of these, in a group of five, gets a value to observe and then the group is appointed to bring out three different outcomes of the scenario: one outcome being full of initiative, one neutral, and one passive outcome. This puts the employees in a situation where they have to take a stand in questions about, for example, sick-leave, stress, customer demands and balance between family and work – all with the basic values in mind.

The health game is supported by the "ladder of initiatives" (see Figure 2), another tool for value deployment. It consists of seven grades, starting with "you as a victim of the circumstances" and ending at the top where "you just go". Being at the top you take initiatives on your own and do not ask the management or co-workers about how to

7 **Just move ahead** → See the problem – act – do not inform
6 **Start to solve** – ask sometimes → See the problem – act – inform – ask sometimes
5 **Start to solve – ask afterwards** → See the problem – act – inform – ask afterwards
4 **Suggest** → **See the problem** – see possibilities – take no action before approval
3 **Ask** → See the problem – orientate around the problem – would like someone else to take over the problem
2 **Wait** → See the problem – take no action – do not bother
1 **Complain** → See the problem – see no possibilities – point to shortcomings.



**Source:** Agria (2004)

**Figure 2.**
Agria's seven grades on the "ladder of initiatives"

solve your problems. The ladder is a development from a three grade scale: being full of initiatives, neutral, or passive. The ladder of initiatives is used in the regular conversations of personal development to discuss the employee's degree of involvement, where the employee is at present and where he or she would want to be in the future. Then a plan of actions is developed, with activities such as project participation or further education. The ladder of initiatives is also a part of daily discussions among employees. "Today I was low on the ladder; I didn't have the energy to take care of this or that", was, for example, heard from one of the employees during a coffee break.

All managers in Agria are supposed to spend 25 per cent of their time on improvement work, 25 per cent as specialists and 50 per cent as coaches. When working with improvement their mission is to create an understanding and willingness for change in the organisation. Managers range from team leaders, with responsibility for about ten employees, via process managers and business area managers to the CEO. One of the ways used to unite managers of the organisation has been Agria's program for leadership development. One day per month all managers of the company get together and listen to speakers and work with cases. As a result, the managers have been able to send a uniform message to the organisation. To be unified as leaders was considered important by the CEO, especially since all people at Agria operate in an open office landscape. In this environment individual behaviour becomes visible and it gets very important as a manager to practise as he/she preaches, and also for all managers to preach the same message. The way the office has been designed helps to give each employee an overview of the company and to understand the relationships between different parts of Agria. It also encourages knowledge transfer and co-operation between disciplines and upholds flexibility as people are switching desks from day to day, even the CEO. The majority of the workplaces are placed in groups of desks in the office landscape, but there are also silent workplaces that can be used when needed.

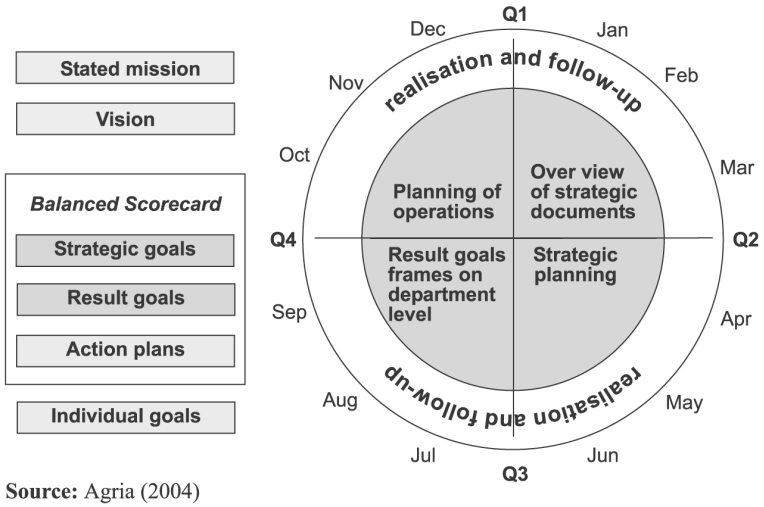
*Employee involvement*

At Agria the employees are named associates. The top management group of the company has often highlighted the important role the employees have played in the organisation's striving for success. According to the CEO:

> Satisfied associates lead to satisfied customers.

On this basis, the managers at Agria have worked with creating commitment and involvement from the employees. As a part of this work Agria has used the standards of Investors in People. This is a standard of working with commitment to ensure that everyone in the company develops, feels involved and understands the goals of the organisation. Three times a year a questionnaire is sent to all employees to further investigate how they feel about their work, the environment and the leadership at Agria. The results of this questionnaire are presented as an index of employee satisfaction.

An integral part of Agria's work with involving the employees is the business planning process (see illustration from Agria in Figure 3). A foundation for this process is the balanced scorecard, with customer, associate, process and economy as perspectives. The business planning is a one-year process. In the first year strategies,




**Source:** Agria (2004)

**Figure 3.**
The business planning process at Agria

goals and action plans are developed. Feedback from the business excellence model process works as an input to the business planning process. The following year consists of realisation, follow-up, analyses of the results and, when needed, adjustment of action plans, parallel with a new planning process.

Long- and short-term goals for the company are established with involvement of all employees. The monthly breakfast meetings are an important place for discussions. It is also one of the occasions when the follow-up of the results takes place. The top management group develops a suggestion for strategic goals for the next period. These goals are then presented at a breakfast meeting, and during the second part of the meeting the employees split into multidisciplinary teams to discuss and develop the goals. The groups present their results on posters, which are displayed at the workplace. These posters are shown for a week and everyone is encouraged to give his or her opinion of the proposals. Opinions are given by putting a green mark for a positive reaction and a red mark for a negative reaction. Then the posters go back to the top management group for consideration and decisions.

As a part of the business planning process, everyone at Agria gets involved in breaking down the yearly result goals to process, department and individual levels. The goals become a basis for Agria's target-related bonus system, which can yield up to ten per cent of annual income. Targets are set on a company level, a department level and on an individual level (see Figure 4). The bonus system is thought to be a way of creating incentives to work in the desired behaviour and direction. One of the employees said:

> The goals on the company level feel distant but the individual goals are easier, they are mostly production targets based on how you did last year and then you are expected to improve.

One way for the employees to take initiatives is to make suggestions to Agria Online Ideas. Agria's suggestion system has been developed to store ideas in a database.

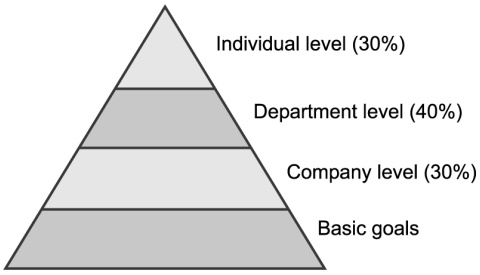
Everyone is able to submit, monitor and send feedback on these suggestions. In the beginning, to encourage use of the system, goals were set in the bonus system for each employee to hand in at least a specified minimum of suggestions. At the time of the case study improvement suggestions had become a natural part of the daily work (see statistics in Figure 5). One employee stated:

> If someone has an idea, it is natural to tell him or her to "make a suggestion" and everybody is aware of that.

Suggestions span from preventive and developing to corrective actions.

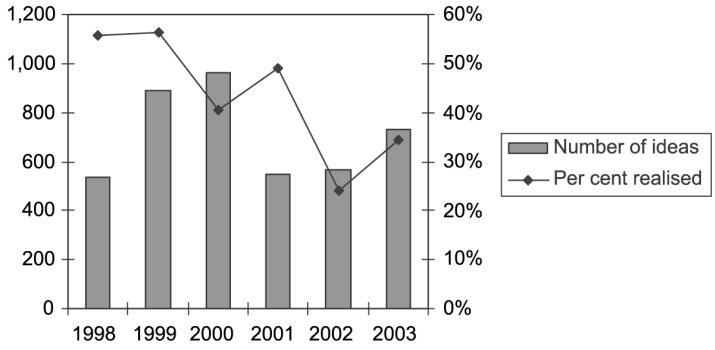
*Process management and control*

According to one of the senior managers Agria has been working consciously with "the flow from customer demand to a satisfied customer" since 1995. In 2000 Agria did the first rework of the organisational chart towards a matrix-organisation. In 2002 a second reorganisation was made, resulting in the organisational structure that was present during the time of the study. The processes map of this organisation is found in Figure 1. A former process owner, now in another position, describes how the process orientation supported customer orientation:




**Source:** Agria (2004)

**Figure 4.**
Agria's target related bonus system, the levels where the goals are set




**Source:** Agria (2004)

**Figure 5.**
Statistics of Agria online ideas – Agria's suggestion system

> It got clearer how my process delivered something directly to the customer. Another new thing is how the process spans over the whole company, with an evident flow through the departments.

All of the processes at Agria have process owners assigned to them, accountable for the performance of their process and for evaluating, developing and improving the process continuously on the basis of customer demands, needs and expectations. The business process owners do not take part in the daily operations, nor do they have responsibility for financial results or staff. All of the process owners report to the process management group, which consists of the process owners and the CEO. The process management group is responsible for giving priority of goals, resources and measures of congruence. To ensure that all employees really understand the process-based organisation, a part of the training of new employees is set aside to meet the process owners.

Parallel to the process organisation there is a traditional functional organisation present, with business area managers responsible for financial results. The business area managers are aided by team leaders with responsibility for the staff. One business process owner described the responsibility in this way:

> The process begins at a customer need and continues to the veterinarian, I am responsible for that part. Then the matter comes in to Agria and the functional organisation has the responsibility but I am still responsible for the whole. As a process owner I have many interest groups to take into account. To be successful we cannot only work with the issues inside our office, our customers are outside the building.

He went on to describe how the employees look at the process orientation:

> It depends on whom you ask about the organisation. From some people you get the functional organisational chart and from others the process map. But it is in the relation between the functional and the process organisation that the dynamics occurs that gives the company lots of energy. But if you cannot separate the two parts of the matrix, the process orientation will probably die out.

He stated that it is the culture and the basic values that make the relation work and help to avoid conflicts. Another important part of the process orientation, according to the process owner, is that everyone takes part in the business planning process and agrees on common goals for the organisation.

The goals are set and the results are measured through balanced scorecards and collected in an in-house developed data warehouse. Since 1998 Agria has been certified according to ISO 9001 and, since 2000, Agria also has been certified according to ISO 14001. The management system is looked upon as creating order among the processes.

*Continuous improvement*

To improve the company's operations Agria has used the criteria of the Swedish Quality Award (The Swedish Institute for Quality, 2004), a tool for customer orientated operational development, to evaluate its operations on a yearly basis since 1998, see result levels in Figure 6. As an output from the award process Agria each year receives a feedback report (The Swedish Institute for Quality, 1998, 1999, 2002, 2003) that gives input to the business planning process.

By continuously working with the criteria of the Swedish Quality Award, and the phases surrounding it, the employees are included in the work with TQM. Employees

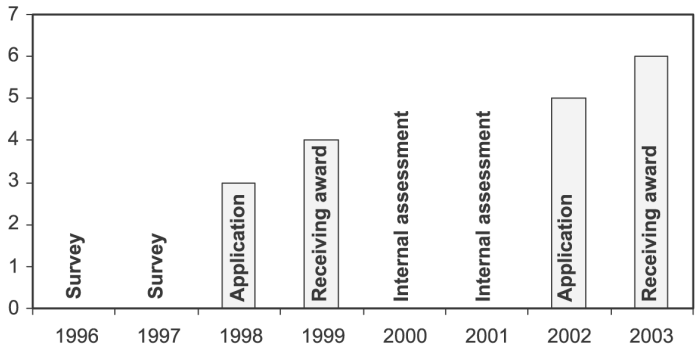



**Figure 6.**
Agria's achieved levels in the Swedish Quality Award over time, from feedback reports (1998-1999 and 2002-2003)

**Note:** Each year the evaluation results in a final grade on a seven graded scale, see SIQ (2004) for further details. The different ways in which Agria has been working are also written in the diagram. The surveys in 1996 and 1997 were "light-versions" of the instrument, developed by a consultant. In 2000 and 2001 Agria used consultants to evaluate the company and to receive feedback

work in project teams when creating the description of the company on the basis of the criteria. Anybody can be a part of these "writing teams" and the participants shift each year. One illustration of how the importance of the employees has been highlighted can be found at the times when Agria received the Swedish Quality Award. The celebrations included everyone at the company. In 1999 Agria was the first award receiving company to make arrangements to broadcast the award ceremony of the Swedish Quality Award, performed by His Majesty the King of Sweden, directly to the office making it possible for all employees to take part in the celebrations.

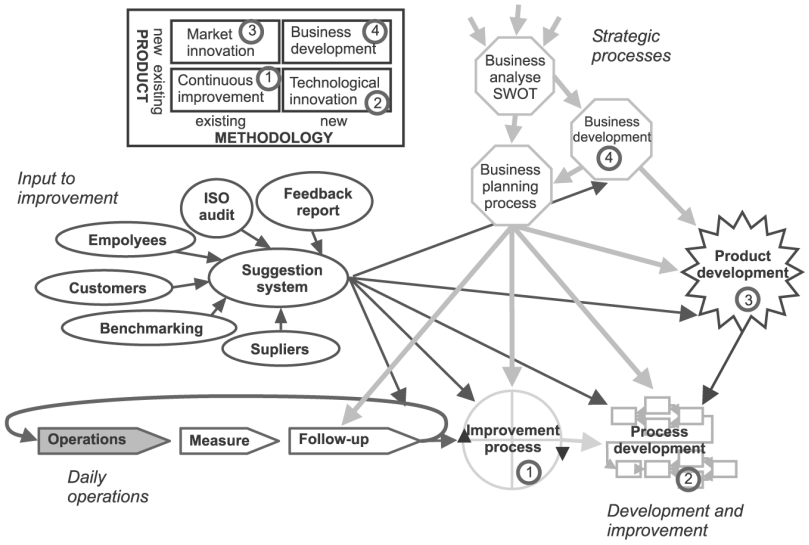
In Figure 7 an overview of Agria's different methodologies and tools is presented.

*Daily operations*. Results are measured as a part of daily operations. By evaluating the results it is possible to discover if a process meets preset standards, or to find trends that indicate that a change is needed.

*Strategic processes*. To be able to evaluate the results of the operations goals are regularly set up for comparison. This is done in the strategic processes, primarily in the business planning process, where the frames of the company are set and where the priorities of improvement projects are developed. The arrows from the strategic processes in Figure 7 represent directions given to other parts of the company.

*Input to improvement*. To be able to work with improvement of processes there has to be some kind of input of needs. One input could be an inconsistency or negative trend in the operations. At Agria input to improvement also comes from a number of other sources: the feedback report from the process of the Swedish Quality Award each year, audits of the ISO 9001 and ISO 14001 management system, employee suggestions, customer feedback, benchmarking and input from suppliers. The suggestion system has been developed as a means of distributing ideas and inputs further on to the different improvement and development processes.

*Development and improvement*. To be successful in competitive environments, companies must work continuously on improving their processes to meet the ever-changing conditions. This work may consist of either big and extensive changes




**Source:** From Palmberg (2004)

**Figure 7.**
An overview of Agria's different methodologies and tools

or small ones in day-to-day operations. The matrix in the upper left corner of Figure 7 describes different kinds of improvement going on at Agria (Horn, 2003):

- *Continuous improvement*. If, on the basis of present routines and existing products, someone makes a change, it could be considered a continuous improvement. Something is done within existing frames, but in a new, and hopefully better, way.
- *Technological innovation*. Technological innovation is when making an improvement in the process but still with the same product or service as the output of the process. The purpose is to satisfy a known need with a new method. It is often a major change that requires budget and resources in the form of competence and a project team.
- *Market innovation*. Creating new products or services that can be delivered by the existing processes, in order to satisfy new customer needs, is called market innovation (in the matrix) or product development (in the figure). At Agria it is primarily in the product committees that the development of new products and services takes place, in close cooperation with customers and suppliers.
- *Business development*. Finding new areas that require new routines is called business development. The division Agria International is an example of this, working with spreading the way Agria operates on a franchise basis to insurance companies in other countries.

The different types of improvement of operations and processes, number 1 and 2 in Figure 7, are debated further in the conclusions and discussion.

## Case analysis

In a literature review by Edwards and Sohal (2003) some of the key issues concerning the implementation of TQM programmes are presented:

- education and training of employees and not letting production demands undermine the benefits of training;
- employee participation and positive view of the impact of TQM; and
- the role of middle management in conveying messages to lower levels of the organisation.

The extensive training in the "Agria-School" of all new employees has ensured that everyone working at Agria is aware of, and understands, the basic values and principles of the organisation. The health game is another way of training, where employees, being away from their normal day-to-day operations, get time for reflection.

The top management of the company have been continuously working to include everyone in the quality-related work. At the monthly breakfast meetings all employees are encouraged to participate in the strategic development of the company. At Agria we found it to be widely believed that by involving employees and other interested parties in a relatively slow decision process the implementation period could be shortened.

By including the whole organisation in the work with TQM through the criteria of the Swedish Quality Award, through the business planning process and through other methodologies and tools described in the case study the top management group at Agria has been able to create strong driving forces for change.

The monthly meetings in Agria's program for leadership development bring managers together to discuss the messages that should be conveyed to lower levels of the organisation. By including all managers; team leaders, process owners, business area managers and top managers, in the same group and working with the same issues concerning leadership, there are no formal leaders left out at Agria to criticise the work of "those upstairs". Instead managers at all levels have become agents of change.

In a longitudinal study of five large Australian organisations van der Wiele and Brown (2002) found a number of factors that had an impact on the development of quality management within these organisations. Some of these factors were found at Agria as:

- *The role of top management*. The charismatic and enthusiastic CEO could be described as a strong driving force and has effectively united the management team as agents of change. Another success factor connected to the role of top management is the deployment of the basic values, the "five always", at Agria. The role of the top management has been significant in the early stages of TQM implementation. As described by one of the top managers, "If the CEO had left after the award of 1999, I'm not sure if the work would have continued like it has. But if he would leave now the work would probably keep on going." The role of the top management has shifted, and now there are structures like the Agria-school or the business planning process that probably would sustain the values and methodologies after a change of CEO.
- *The driving force behind the quality management implementation over a long term*. A primary driving force behind the implementation of TQM at Agria has

been the persistent will of the CEO and several others in the organisation not to become satisfied but to continuously strive to improve with new initiatives of change. According to the interviews, external pressure to implement TQM has been negligible.

The phases connected to the Swedish Quality Award have been used as a framework to direct and review the quality management implementation process. Audits and assessments due to the ISO 9000 and ISO 14 000 certifications have also given inputs to the improvement work at the company.

van der Wiele and Brown (2002) conclude that every organisation "needs to discover and work out for themselves how to apply the core principles behind such concepts in ways which are meaningful to their business operations." That is probably one of the most important explanations to why Agria has succeeded so well. Methodologies and tools have been selected by their end users on the basis of their opinion of what was needed, and have also been adjusted to fit the operations of the company.

On the basis of a study of three Slovene companies, Ambrož (2004) concludes that corporate culture and self-image play important roles when implementing TQM. Through their value-focused leadership the managers at Agria have effectively changed the norms and basic values of the organisation. The corporate culture has also been affected by the recruitment policy of the company, which has favoured applicants with a strong interest in animals and animal care.

The self-image of the company has been strengthened by the largely positive response that has been received from customers in the Agria satisfied customer index. Of course the two quality awards have also had great impact on the self-image. Employees at all levels have been acknowledged for the success of the company. Improvements are described not as a result of work made by a few, but as a result of all efforts made by everyone in the organisation.

## Conclusions and discussion

In conclusion, it seems clear that nearly all of the managers at Agria have succeeded in focusing their leadership on values and visions rather than rules and regulations. The basic values, the "five always", are more than just words, they truly characterise operations at the company. The study has focused attention on joint leadership as an explanation to this achievement. Through the program for leadership development leaders at all levels have been able to give a collective, united message and to demonstrate the importance of the basic values. At Agria most leaders harbour the belief that having everybody involved is a key to success. This became evident in, for example, the business planning process with a high degree of involvement by employees at all levels of the company.

It is not uncommon for companies to have close cooperation with their customers or with the groups representing them. What could be more unusual are the extent, as well as the systematic way, in which, for example, the customer surveys of the Agria satisfied customer index are being made. But our contention is that the foremost factor contributing to the deep-rooted customer focus at Agria has been the recruitment policy, which strengthens the employees' commitment to the stated mission of the company, to "use expertise and commitment in order to develop and sell security for animals and people." The fact that all employees can easily put themselves in the

position of the customer having an animal in need of care has probably been the greatest contributory aspect of Agria's customer focus.

Process management is a tool in the work with continuous improvement at Agria. One of the process owners said:

> The process orientation gives the opportunity to discover bottlenecks in the operations and them to improve and develop the processes. It is also a help when prioritising among measures and of course it highlights the customer needs.

Top management at Agria has succeeded in building trust and dynamics between the process organisation and the functional organisation, something that is probably as difficult as it is important.

At Agria goals are set and measured through the use of balanced scorecards. Measurements have become a natural part of the job and the employees that are working directly with customers are measured daily and individually by the number of customer cases handled. In addition to this a great number of production measurements are used. On the other hand, it was not always clear to the interviewees how these measurements have been selected to manage the operations leading towards the stated mission. Therefore, this should be an important area to look further into for the company.

During the action research part of the study we found that Agria has been working with operations improvement on three different levels (see Figure 8). The levels of improvement differ in extent and degree of systematisation and in degrees of how mature the organisation has been in its work with quality-related issues.

The third level, which could be found in many companies today, is process development – a discontinuous and often project-based approach with groups assigned to specific improvement tasks. It consists of knowledge of, and systems for, how to run larger development projects. This is the most extensive improvement level, where the problem to be solved requires a major work effort. At Agria a project team is appointed by the process management group and a budget and time plan is developed.

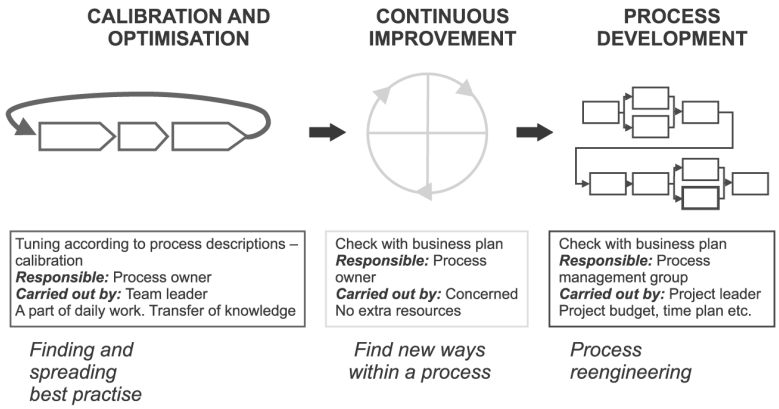



**Figure 8.**
Levels of change and operations improvement

**Source:** From Palmberg (2004)

In order to harmonise improvements with the goals of the company, goals of each process development project are set based on the general business plan.

The middle level of this model is continuous improvement – to find new ways on the basis of new ideas or indications of shifting trends in process performance. This is a structured way of working, with tools such as the wheel of improvement (Plan – Do – Study – Act (PDSA), see Deming, 1993), and can often be found in organisations working consciously with TQM. To improve continuously within the existing process map is an expected part of daily work for process owners at Agria. Employees that are affected by changes often assist the process owner in finding new solutions, or even become responsible for the change themselves. To ensure that improvements made are in line with the general goals of the company a comparison is made between the goals of the individual improvements and the goals set in the business plan.

The first level has been called calibration and optimisation. Work of operations improvement at the first level is supposed to ensure that routines and process descriptions are followed as intended, that micro improvements of practice are made within present routines, and that best practise is developed and spread across the entire workplace. Team leaders are responsible for upholding a climate, where ideas are shared among employees and where everyone relentlessly looks for possibilities of improvement by questioning present ways of working. When something comes up that implies a change of routines, it gets formalised as continuous improvement and is transferred to the middle level of the model. If structural changes are needed, a project of process development is initiated (the third level of the model).

The approaches needed are dependant on which type of situation that is present. Therefore it should be important to be aware of the differences between the levels of operations improvement. Organisations should be able to gain from developing knowledge and methodologies regarding the different levels of improvement. It may be argued that it could be fruitful to start with continuous improvement, the middle level, to find ways to handle creativity and improvement suggestions in the daily work of developing the operations. Further on, when facing larger improvement needs, there is a demand for a more comprehensive approach, the third level. In the case of Agria a five-step model with checkpoints for how to operate projects was developed. Having dealt with these two levels of change and improvement the company could proceed with working on the first level, calibration and optimisation. This first level is possibly the one with the highest requirements on employee involvement and corporate culture. When looking at continuous improvement and process development, Agria is in the frontline. Therefore, it is probably at the level of calibration and optimisation that the company has the highest potential of development.

It is significant that Agria has succeeded in deploying a number of basic quality-related values that leaven through the organisation. On the basis of these values the company has been able to develop and implement methodologies and tools that maintain to strive for improvement. Every organisation needs to find methodologies and tools that support its values when working at different levels of change. If an organisation can manage to combine values of continuous improvement, process management and customer focus with methodologies and tools that support these values, sustained quality management should be in reach.

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## PAPER 4

# Exploring process management: are there any widespread models and definitions?

Palmberg, K.

The TQM Journal, 2009, Vol. 21, No. 2, pp. 203–215.

# Exploring process management: are there any widespread models and definitions?

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## Abstract

**Purpose** – Process management has been around for a long time, but unlike that of many other management trends, the interest in process management has remained high. The starting point for the study was the idea that the lack of well-established conceptual models and definitions of process management play a role in the challenge and difficulty facing organizations when trying to manage their processes on a strategic level. The purpose of the study was to explore whether there really are some existing widespread and common models and definitions for process management in the literature? The aim of this paper is to describe and explore the findings from the study.

**Design/methodology/approach** – A structured literature review is used to identify contemporary models and definitions for process management.

**Findings** – There are several descriptions and definitions of process management presented in the literature, but none that seems to be really widespread and well-established. However, the analysis indicate two different movements: process management for single process improvement; and process management for system management. The results from the literature review are summarized in an aggregated model of existing descriptions of process management. The varying purposes of working with process management demonstrate a diverse need for both movements. Still, the focus of a majority of the identified tools and approaches for process management is to contribute to the more mechanistic movement, the first, of systematically improving single processes.

**Originality/value** – The paper provides a literature review, the identification of two different movements within process management and presents an aggregated model of existing descriptions of process management. Implications of the findings on process management in organizations are discussed and further research suggested.

**Keywords** Literature, Organizations, Process management, Quality concepts

**Paper type** Research paper

## Introduction

Process management has been around for a long time, but unlike that of many other management trends, the interest in process management has remained high (Hellström, 2006). There is an ongoing discussion among both practitioners and scholars about how to best manage the value creating flows of activities that run through all organizations.

Numerous process definitions have been proposed through the years, most of them fairly similar. Still, there many disparate views among practitioners regarding the

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concept of processes and process management (Armistead *et al.*, 1999; Belmiro *et al.*, 2000; Isaksson, 2006). Further, when it comes to managing the processes on a system level, process management, the notions and definitions used varies widely (Garvin, 1995; Armistead and Machin, 1997; Pritchard and Armistead, 1999; Ljungberg, 2002; Biazzo and Bernardi, 2003; Hellström and Eriksson, 2007). In addition, the approaches and tools suggested for process management varies both in the literature and in practice and give few clear-cut directions on how to deploy process management (Hellström and Eriksson, 2007).

In parallel, many organizational quality practitioners seem to have grown frustrated about the senior managers' lack of attention on process management. On the other hand, many senior managers still appear to be quite confused regarding why and how to use process management on a strategic, system level (Palmberg, 2005).

The starting point for the study was the idea that the lack of well-established conceptual models and definitions of process management play a role in the challenge and difficulty facing organizations when trying to manage their processes on a strategic level. The purpose of the study was to explore whether there really are some existing widespread and common models and definitions for process management in the literature?

The purpose of this paper is to describe and explore the findings from the study. The findings (descriptions of process management) are structured, analyzed and presented. The results are summarized in an aggregated model, Figure 1, of existing

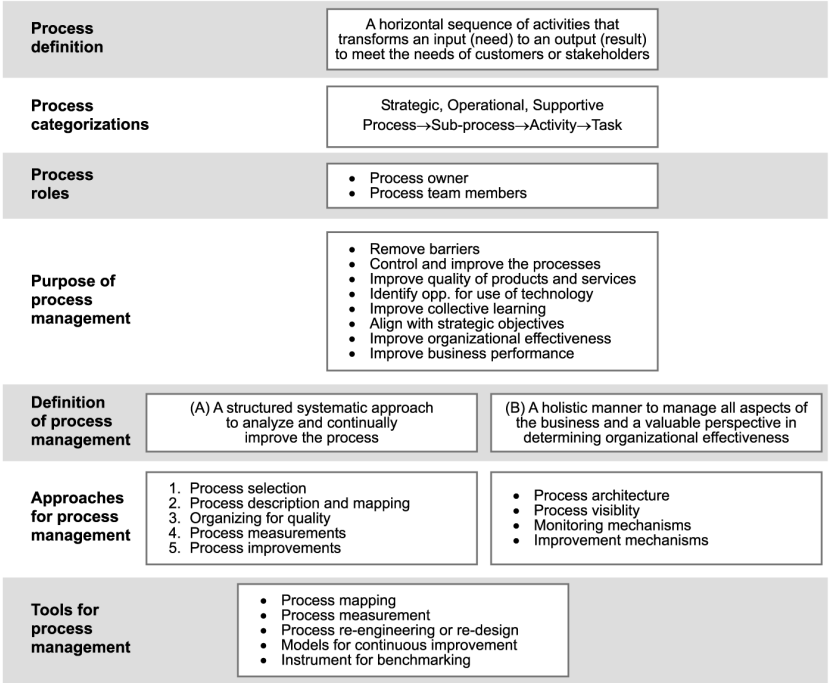



**Figure 1.**
Model summarizing the result and analysis of the literature review of descriptions of process management

descriptions of process management. Implications of the findings on process management in organizations are discussed and further research suggested.

## Method

A structured literature review is used to identify contemporary models and definitions for process management. The phrase "process management" is commonly used in several fields of research (Armistead *et al.*, 1999). Searching all fields on any combination of the phrase made 2,747 hits on Emerald, 2099 on EBSCO and 2,276 in Compendex. Based on the number of hits and on convenience Emerald was chosen as the source for the further literature search (see Figure 2).

The search was narrowed down to the exact phrase of process management in keywords or title. This resulted in 223 hits which were sorted on relevance and the work of reading titles and abstracts began. In total, 59 articles were found to be interesting for further review.

A follow-up analysis was performed to examine the content of the articles out of scope. The first 50 articles that were reviewed on title and abstract were examined. The analysis showed that the 27 articles which were found to be out of scope covered: manufacturing and production (13), IT/computer science (4) and in the area of interest for the review, but not in scope for the purpose of the study (10) (see Table I).

The studied articles have been published fairly evenly over the period 1993-2007, see Figure 3. This is in line with Hellström (2006) who concludes that the number of published articles on process management in the management journals has been fairly constant since the 1980s.

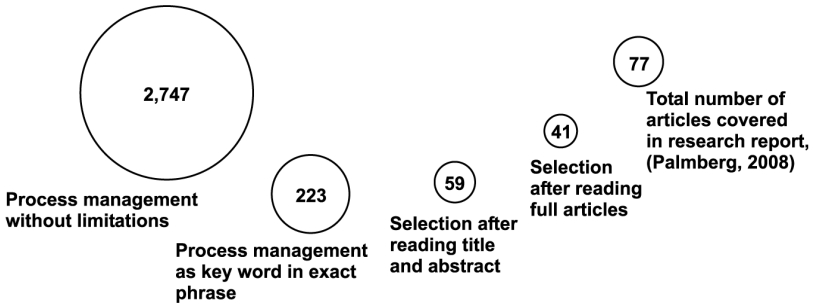



**Figure 2.**
The number of articles included in the study during different phases

| Articles sorted on relevance | Article 1 to 50 | Article 51 to 223 | Total no. of articles |
|---|---|---|---|
| Interesting for further review | 23 | 36 | 59 |
| Out of scope, of which: | 27 | 137 | 164 |
| Manufacturing and production | 13 | | |
| IT/computer science | 4 | | |
| Right field, but out of scope | 10 | | |

**Table I.**
Number of articles found in Emerald on exact phrase "process management" in title and keyword, sorted on relevance

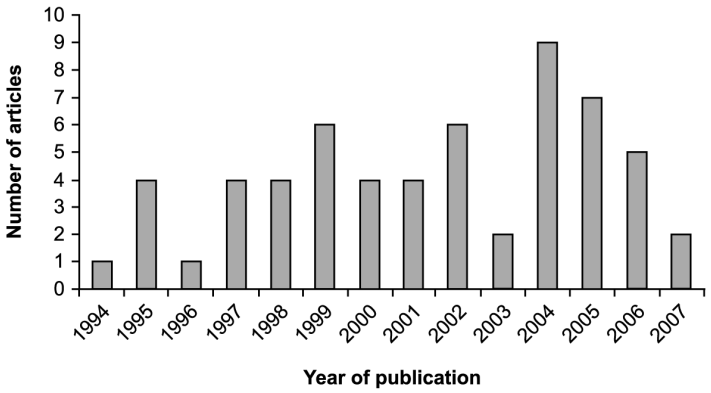



**Figure 3.**
Distribution of articles over time in selection after reading title and abstract

After reading the full articles the selection was narrowed down to 41 items. Additional articles were also identified through references during the reading. In total the review covers 77 full articles, see research report by Palmberg (2008) and Figure 2.

In order to enable a structure for categorization of the found material three areas of interest were selected based on the purpose of the review:

(1) process definitions, categorizations and roles;

(2) definitions of process management; and

(3) approaches and tools for process management.

The text was marked and named with headlines. All quotes were gathered in a research report, using the areas of interest as headlines; see Palmberg (2008).

The analysis has been based on the assembled marks from the articles. When approaching the identified areas of interest a list of second level labels, hypothesis to be analyzed, was iteratively developed, containing questions and areas for analysis such as:

- *Area of interest.* Process definitions.
- *Second level labels.* Input and output, Interrelated activities, Cross-functional, Purpose, Repeatability and Use of resources.

In the area of definitions of process management the RADAR[1] logic from the EFQM excellence model (EFQM, 2003) was used as an inspiration to categorize the material:

- *Area of interest.* Definitions of process management.
- *Second level labels.* What is process management? What is the purpose, the result (R) to be achieved by using process management? What are the approaches (A) within process management? How process management is deployed (D) – with the use of what tools?

The hypotheses were based on a pre-understanding of both the literature and experience from working with processes management in organizations.

## Results and analysis

The material in the research report was further analyzed and formulated into the following sections.

### *Process definitions, categorizations and roles*

Almost all of the studied authors define "process" in their own words. There seems to be no single definition standing out to be the most broadly spread or most widely used. The differences found between the identified definitions have been reduced to six components that can be seen in a majority of the definitions:

(1) *Input and output.* Articles that, except the early ones from Davenport and Short (1990) and Harrington (1991), describe the concept of an input that initiates the process and an output which is the result of the process.

(2) *Interrelated activities.* A majority of the authors describe the components of the process as interrelated activities (Harrington, 1991; Hammer and Champy, 1993; Talwar, 1993; Rentzhog, 1996; Armistead and Machin, 1997; Llewellyn and Armistead, 2000; Ljungberg, 2002; Isaksson, 2006).

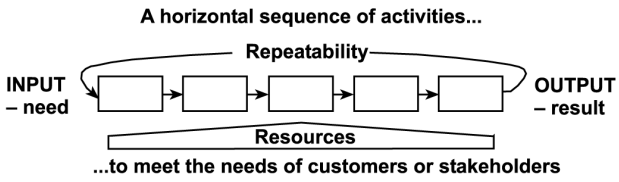
(3) *Horizontal: intra-functional or cross-functional.* Sandhu and Gunasekaran (2004) are the only authors found that define a process as a series of activities that "involves an independent functional unit". A dominating view seems to be that processes are horizontal and cross-functional (see for instance Jacobson, 1995; Armistead and Machin, 1997; Lee and Dale, 1998; Llewellyn and Armistead, 2000).

(4) *Purpose or value for customer.* Having a process external perspective, including a wider purpose of the process – i.e. to meet the needs of customers, stakeholders or other interested parties. This is mentioned in several articles (such as Davenport and Short, 1990; Harrington, 1991; Hammer and Champy, 1993; Talwar, 1993; Jacobson, 1995; Belmiro *et al.*, 2000; Ljungberg, 2002; Isaksson, 2006).

(5) *The use of resources.* Mentioned by a few authors (Biazzo and Bernardi, 2003; Isaksson, 2006), who include the use of resources in their definitions.

(6) *Repeatability.* Mentioned by a few Swedish authors (Rentzhog, 1996; Ljungberg, 2002; Isaksson, 2006).

A gross process definition should, based on the included articles, include all the components above (see Figure 4). A net process definition can be condensed to: A horizontal sequence of activities that transforms an input (need) to an output (result) to meet the needs of customers or stakeholders (see Figure 5).




**Note:** The definition includes the components; input and output, interrelated activities, horizontal, purpose, use of resources and repeatability

**Figure 4.**
A gross process definition

In the reviewed articles both categories of processes and hierarchies within processes are described (see Figure 6). The analysis of the reviewed articles has identified three general process categories (see also Davenport, 1993; Jones, 1994; DeToro and McCabe, 1997; Llewellyn and Armistead, 2000; Sandhu and Gunasekaran, 2004; Isaksson, 2006):

(1) *Strategic management processes*. Covering strategy, planning and control where management oversees and supervises the system (DeToro and McCabe, 1997; Armistead *et al.*, 1999; Chapman, 2001; Sandhu and Gunasekaran, 2004; Isaksson, 2006).

(2) *Operational delivery processes*. Producing outputs and results for external stakeholders (Jones, 1994; DeToro and McCabe, 1997; Armistead *et al.*, 1999; Isaksson, 2006).

(3) *Supportive administrative processes*. Required to sustain and support the delivery processes (Jones, 1994; Armistead *et al.*, 1999; Isaksson, 2006).

In a similar way the levels or hierarchy of processes described in the reviewed articles has been summarized into four categories; process, sub-process, activities and tasks (see also Harrington, 1991; Walsh, 1995; DeToro and McCabe, 1997; Lillrank and Liukko, 2004).

Perhaps the most deviant categorization of processes is the "quality broom" described by (Lillrank and Liukko, 2004) which divides processes into standard, routine and non-routine. The level of uncertainty is described to be larger in the non-routine processes and is better managed with a quality culture. While standard

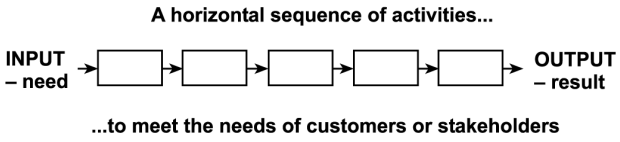



**Figure 5.**
A net process definition

**Notes:** A horizontal sequence of activities that transforms an input (need) to an output (result) to meet the needs of customers or stakeholders. Excluding the components of use of resources and repeatability, only mentioned by a few authors

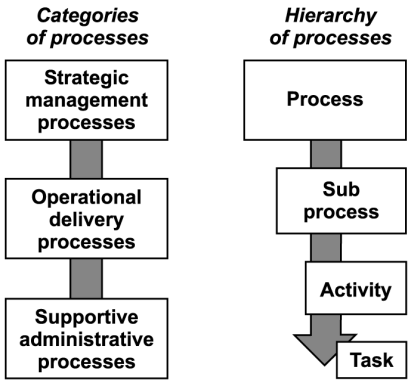



**Figure 6.**
Two ways to categorize processes

processes with identical repetition and a low level of uncertainty can be managed with quality systems.

There are two process roles described in the reviewed articles. The role of the process owners is described as: accountable for all process improvement results with authority to approve process changes (DeToro and McCabe, 1997), responsible to optimize efficiency and effectiveness, ensuring that external customers' requirements are met (DeToro and McCabe, 1997) and overseeing performance control and continuous improvement (Biazzo and Bernardi, 2003).

The other role described in the literature is the one of the member in cross-functional process teams (DeToro and McCabe, 1997; Lee and Dale, 1998; McAdam and McCormack, 2001). Their role is portrayed by DeToro and McCabe (1997, p. 58) as: "to map and document the process, assess performance, analyze deficiencies, select an improvement strategy, propose design changes, implement fixes, and assess results". The process teams are also described as supporting employee empowerment.

*Definitions of process management*

The literature study of definitions of process management gave a large amount of material which was further categorized into a second level of labels.

*What is the purpose of process management?* As was the case with most of the findings from the literature review there are also differing opinions regarding the purpose of process management:

- to remove barriers between functional groups and bond the organization together (Jones, 1994; Llewellyn and Armistead, 2000);
- to control and improve the processes of the organization (Melan, 1989; Pritchard and Armistead, 1999; Biazzo and Bernardi, 2003; Sandhu and Gunasekaran, 2004);
- to improve the quality of products and services (Melan, 1989; McAdam and McCormack, 2001; Sandhu and Gunasekaran, 2004);
- to identify opportunities for outsourcing and the use of technology to support business (Lindsay *et al.*, 2003; Lock Lee, 2005);
- to improve the quality of collective learning within the organization and between the organization and its environment (Bawden and Zuber-Skerritt, 2002);
- to align the business process with strategic objectives and customer needs (Lee and Dale, 1998); and
- to improve organizational effectiveness and improve business performance (Jones, 1994; Elzinga *et al.*, 1995; Armistead *et al.*, 1999).

There appear to be few major differences in directions or groupings in the reviewed articles regarding the purpose of process management, just a broad variety of arguments for working with it in one way or the other.

*What is process management?*. Very few of the studied authors thoroughly answer this fundamental question. It appears as though the answer is implicit but widely agreed upon. Still, there seems to be differences in what the authors consider process management to be. The analysis reveals two distinctly different movements; process management for single process improvement and process management for system management (see Figure 7).

The first movement, focusing on the management and improvement of single processes, can be summarized into the statement (A): A structured systematic approach to analyze and continually improve the process. This view is shared by (Elzinga *et al.*, 1995; Zairi, 1997; Lee and Dale, 1998; Biazzo and Bernardi, 2003).

A holistic view on process management as a part of managing the whole organization is supported by (Lee and Dale, 1998; McAdam and McCormack, 2001; Bawden and Zuber-Skerritt, 2002). This is described by Pritchard and Armistead (1999, p. 22) as (B): "a more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness".

Lee and Dale (1998, p. 218) somewhat summarize the two views, (A) and (B) above, as: "Business Process Management is both a set of tools and techniques for improving processes and a method for integrating the whole organization and it needs to be understood by all employees".

## Approaches and tools for process management

Many authors have combined tools and techniques into methodologies and checklists that are of a consulting character, in this paper these are labeled approaches for process management: how to, step by step, work with process management. The analysis of the material shows a divergence in line with the two different movements, (A) and (B), of what process management is (see Figure 7).

The methodology corresponding to the first definition, (A) process management as a structured systematic approach to analyze and continually improve the process, can be summarized as:

(1) *Process selection*. Based on analysis of the value chain (Pritchard and Armistead, 1999), identifying customers and suppliers (Sinclair and Zairi, 1995), data collection and process targeting (Armistead *et al.*, 1999; Gardner, 2001).

(2) *Process description and mapping*. Understanding and defining the process (Melan, 1989; Harrington, 1995), key activities (Sinclair and Zairi, 1995) and the process architecture (Pritchard and Armistead, 1999; Armistead *et al.*, 1999).

(3) *Organizing for quality*. Establishing ownership of the process, defining and appointing process owners (Melan, 1989; Harrington, 1995; Armistead *et al.*, 1999; Pritchard and Armistead, 1999).

(4) *Process measurements and quantifications*. Identifying performance measurements and targets for controlling the process (Melan, 1989; Jones, 1994; Harrington, 1995; Sinclair and Zairi, 1995; Armistead *et al.*, 1999; Pritchard and Armistead, 1999).

(5) *Process improvements*. Identifying process improvements, e.g. based on measurements and taking corrective actions (Melan, 1989; Jones, 1994;

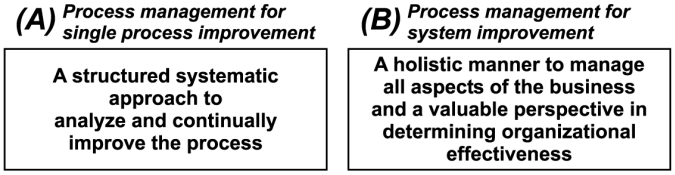



**Figure 7.**
Two different movements in what the authors consider process management to be

Harrington, 1995; Armistead *et al.*, 1999; Pritchard and Armistead, 1999), including management of the improvement process and methodology (Jones, 1994).

Lock Lee (2005) presents a methodology that is focused on the design and implementation of software products supporting business processes. This is in line with definition (A) of process management, but with a strong focus on the purpose of identifying opportunities for outsourcing and the use of technology to support business suggested by Lock Lee (2005) and Lindsay *et al.* (2003).

There were hardly any methodologies found that support definition (B) of process management as a more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness. In Biazzo and Bernardi (2003) a methodology is described by four strategic decision-making areas that form, what the authors call, a process management system:

(1) *Process architecture*. The constitutive component of a PM system where you describe the processes in the organization in a holistic and systematic manner.

(2) *Process visibility*. Divided into two dimensions: the relationship between the process architecture and the organizational structure; and the formalization of the functioning of the processes which gives them operating visibility.

(3) *Monitoring mechanisms*. The design of a performance measurement system that will examine and evaluate process performance. With performance indicators that reflects the strategic objectives of the organization.

(4) *Improvement mechanisms*. The approaches that determine how plans for change will be selected, launched and managed. They should structurally link improvement activities to the daily work and make organizational change systemic and systematic.

The components presented by Biazzo and Bernardi (2003) bear a resemblance to the methodologies that supports the definition (A) but with an emphasis on holism and the connection between the work with processes and the strategic objectives of the organization.

The tools suggested to be used when working with process management are diverse: process mapping (McKay and Radnor, 1998; McAdam and McCormack, 2001; Biazzo, 2002; Isaksson, 2006), process measurements (Melan, 1992; Lockamy III and McCormack, 2004), process re-engineering or re-design (Lee and Dale, 1998; DeToro and McCabe, 1997; McKay and Radnor, 1998), models for continuous improvement such as the PDSA-cycle (DeToro and McCabe, 1997; Lee and Dale, 1998) and instruments for benchmarking (DeToro and McCabe, 1997; Lee and Dale, 1998).

## Conclusion

The findings from the literature review, descriptions of process management, are structured and summarized in an aggregated model for process management (Figure 1). The model describes a summary of the process definition, categorizations and roles described in the literature included in the review. Further on it describes process management including purposes and definitions of and approaches and tools for process management.

The result and analysis of the literature review shows, in line with earlier research, that there seems to be no really common definition of the concept of processes and process management (Armistead *et al.*, 1999; Belmiro *et al.*, 2000; Isaksson, 2006). Still, there are similar components in the process definitions of the included literature. These can be condensed into a net definition, found above in Figures 5 and 7 and at the top of Figure 1.

There are several descriptions of process management presented in the literature, but none that seems to be really widespread and well-established as a definition. This is in line with what previous research has shown (Garvin, 1995; Armistead and Machin, 1997; Pritchard and Armistead, 1999; Ljungberg, 2002; Biazzo and Bernardi, 2003; Hellström and Eriksson, 2007). However, the result and analysis of the definitions of process management in the included literature shows two different movements, (A) process management for single process improvement and (B) process management for system management (see Figures 1 and 7). This is similar to the two models of process management of (Nilsson, 2003) (described in (Hellström, 2006)) described as;

(1) a more mechanistic orientation that is characterized by a focus on structural element; and

(2) an organic orientation that is strongly related to the people in, and the flexibility of, the process.

## Discussion

The varying purposes of working with process management, described in the covered literature, demonstrate a diverse need for both movements, (A) and (B), of process management. Still, the focus of a majority of the identified tools and approaches for process management is to contribute to the more mechanistic movement (A) of systematically improving single processes. It is a technical and instrumental approach that characterizes the definition of and approach for process management in movement (A).

When it comes to the more holistic movement (B), process management as one of several valuable perspectives in the system management of an organization, hardly any tools and approaches have been found in the literature. Even the identified approaches corresponding to movement (B) can be applied in a linear, mechanistic way – contributing successfully to single process improvements but not as effectively to a strategic and holistic management of the whole organization. This is in correspondence to Lindsay *et al.* (2003).

The approaches and tools for improving single processes (A) might be mostly suitable for use on an operational level, while the tools and approaches in movement (B) is aiming primarily for the strategic level of an organization. The operational level should be very important for the daily work of process management and improvements throughout the organization, at all levels. As a suggestion, the definition and approaches for movement (B) could be further developed into a model for system management.

It can be discussed whether or not the shortage of approaches and tools for process management on a strategic level is contributing to the often seen confusion and discontent among senior managers regarding the perceived lack of clear results from implementing process management. The lack of a widely recognized model for process management might be a contributing factor to the challenges and difficulties that meet

leaders when trying to manage organizational processes on a strategic, system level. It can be argued that many organizations today aim at applying process management of both (A) and (B), using the existing tools and approaches that mainly are developed for (A), but largely expect holistic results on a strategic level.

A wider discussion regarding the interests of practitioners and researchers within the field of process management can be introduced, questioning today's strong focus on the technical and instrumental parts of process management; the definition of a process, the levels and categorizations of processes, and the techniques for mapping and documenting processes on an activity level. Many organizations devote extensive resources to web-based documentation systems, presenting their processes in several levels (lately I have seen up to eight such levels) from main processes down to individual tasks – without having a discussion of how to structurally link the process management work to the strategic objectives and priorities of the organizations. It is hardly surprising that the work with process management does not deliver a more holistic manner to manage all aspects of the business and as a valuable perspective to adopt in determining organizational effectiveness.

There might be a risk in losing the overall business perspective when focusing heavily on maps, tools and checklists aiming for documentation, finding a process structure and designing the process organization. A lot of energy in quality functions and process development is aimed at building structures with process owners, process teams and a parallel organization to the traditionally functional organization. It might be important to visualize relationships between the process architecture and the organizational structure and to formalize the functioning of the processes. However, the efforts cannot start here without the strategic discussion and making a standpoint on how process management should contribute to the business performance.

There is a strong need for process management practitioners and researcher to develop and formulate approaches and tools that have the potential to contribute to process management not only on a single process level but on a strategic system level in the organization.

## Note

1. Results, Approach, Deployment, Assessment and Review (EFQM, 2003).

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## PAPER 5

# An alternative case study approach in management research

Palmberg, K.

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# 12 An alternative case study approach in management research

Klara Palmberg

## 12.1 Abstract

The business environment has changed radically during the last decades and there is an increased need for researchers to interact with organizations to develop new knowledge on management. Case studies are a widely used approach for management research, yet the traditional case study seems to be predominantly based on a positivistic and deductively focused approach. In opposition, a more holistic and inductive approach is suggested. The purpose of this paper is to discuss and reflect on how to increase the relevance of management research through improved methodological choices.

The traditional approach, where previous research and theory guides the case study, is opposed. Instead, the researcher's preunderstanding is emphasized, guiding the identification of relevant concepts and a purposeful selection of cases to study. The planning phase is followed by iteration between the theoretical sampling of data sources and data collection. The data are continuously coded and categories emerge inductively. The analysis is performed interactively with management practitioners. The objective of the alternative case study approach is to reach a combination of theoretical and practical results.

The objective of the alternative case study approach is to be open to, and strongly driven by, the influence of practitioners. To achieve this in a systematic manner, several methodological steps are introduced. The open and dynamic alternative research process suggested should be able to facilitate increased relevance in management research.

## 12.2 Introduction – the need for knowledge development in the management field

In the contemporary business and management literature, several challenges facing organizations and managers of today can be identified. One of the dominating challenges seems to be the development of information technology that affects the way we communicate and the conditions for the organization, business and production of goods. The new technology enables globalization, where today a larger part of the world is interconnected by flows of information, money and goods. Further, the interconnectedness creates an unprecedented transparency where the cost of information is very low compared with that of the pre-Internet era. The decreasing cost of, and accelerating access to, information provides individuals with enhanced control and power (Hamel, 2007). Tapscott and Williams (2006) state that the scientific and technological advances result in an openness that is developing into a new managerial challenge. As a consequence, according to the literature, these trends require organizations that can combine efficiency with flexibility and innovation (Cohen, 1999; Sandberg and Targama, 1998; Hamel, 2007). However, several authors find that many of the existing principles for management have not changed significantly since the industrial age, and are therefore obsolete (Hamel, 2007).

In a debate article in the Swedish business press, the Director General of Vinnova (the Swedish Governmental Agency for Innovation Systems) together with the former chairman of Unionen, a Swedish trade union, argue that the knowledge about successful practical management is crucial for organizations today. They call for research on how growth and success can be created through leadership and management and how organizational prerequisites can be created for innovation, efficiency and competitive-

ness. Further, they claim that existing management research has not kept up with the new demands of our time (Eriksson and Kranzt, 2008).

Sandberg and Targama (1998) make the point that the development of our society stresses the need for understanding, instead of finding the causal relationships between events. Svensson (2008) claims that "the knowledge exists outside the academia" and adds that our task as researchers is to interact with organizations to develop new knowledge on management. Lee *et al*. (2007) argue that empirically based case studies have the potential to contribute to the development of both theory and practice. The use of case studies is becoming an increasingly important approach in many management research disciplines because of its ability to investigate little-known and complex phenomena such as organizations (Gummesson, 2000, 2007, 2008). In a review of articles on qualitative research published in leading American journals, the case study approach presented by Yin (2003) is found to be the most predominantly used approach (Lee, 1999 in Lee *et al*., 2007).

The purpose of this paper is to discuss and reflect on new methodological choices for increased relevance of management research. I will critically reflect on the approaches and methodologies commonly used. A suggestion of an alternative case study approach will also be presented.

## 12.3 Traditional case studies

Positivistic-orientated research is generally dominated by ambitions to reduce phenomena into isolated pieces where cause and effect relations can more easily be discovered. Popper (1959) states that "to give a causal explanation of an event means to deduce a statement which describes it, using premises of the deduction of one or more universal laws", quoted in Argyris *et al*. (1985, p. 13).

The general ideas of positivism have previously been widely accepted by both practicing scientists and by the informed public (Argyris *et al*., 1985). It has also been the predominant approach among social scientists (Bernstein, 1976), even though many positivistic-orientated methods were originally designed with natural sciences in mind. Kalleberg (1993) em-

phasizes the hypothetic–deductive approach as a part of the methodological and analytical design of positivistic research.

When describing the case study method, Yin (2003) does not explicitly adhere to any specific paradigm, but often uses the metaphor of the laboratory, describing the properties of natural sciences as something for social science to strive for.

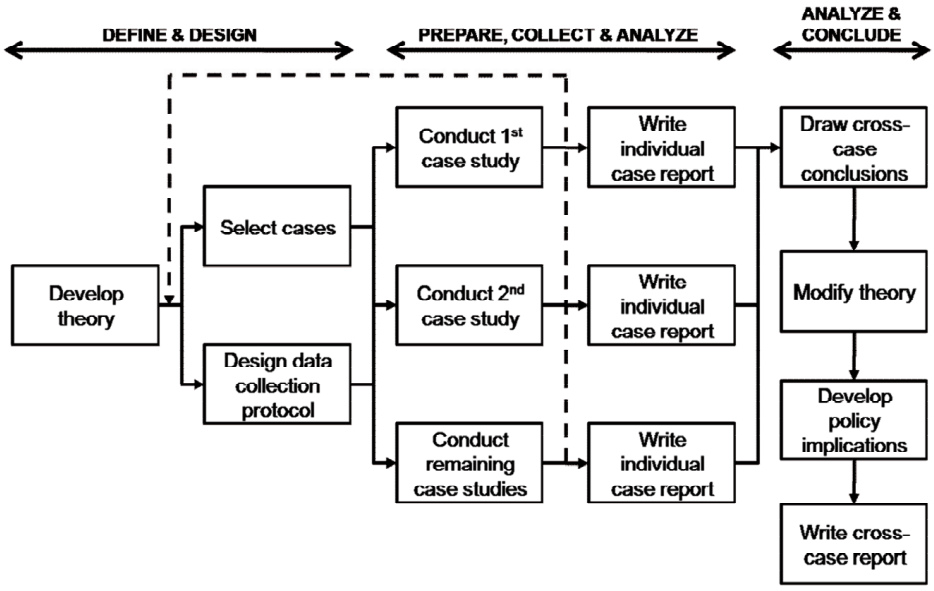


**Figure 12.1 – The case study method of Yin (2003, p. 50), a traditional method predominantly used in qualitative research according to Lee (1999, in Lee et al. 2007).**

The design of a case study according to Yin (2003), see Figure 12.1, directs attention to the propositions that are intended to be examined within the scope of the study – reflecting a theoretical issue. He proposes theory development as a first and essential step prior to the data collection. The theoretical propositions and research design "will effectively force you to begin constructing a preliminary theory related to your topic of study" (Yin, 2003, p. 28), thereby providing a "blueprint" for the process of data collection.

As a next step in the "define and design" phase, Yin suggests that "each case study and unit of analysis should be similar to those previously studied by others or should innovate in clear, operationally defined ways. In

this manner, the previous literature therefore also can become a guide for defining the case and unit of analysis" (Yin, 2003, p. 26).

The design of the data collection protocol, parallel to the selection of cases, includes thorough planning of the case study containing the whole process from defining objectives, finding relevant theory, designing field procedures and case study questions to the development of a guide for the final case study report (Yin, 2003, pp. 67-69).

The second phase of "prepare, collect and analyze" includes conducting the study of each case separately, and writing individual case study reports. In the phase of "analyze and conclude", cross-case conclusions are drawn. Finally, theory is modified, policy implications are developed and a cross-case analysis is performed.

When using the case study approach presented by Yin (2003), much of the attention is on the first phase of "define and design". Yin states that the case study planning should be as detailed as a laboratory instruction, where the whole of the study including the report is planned in detail prior to the start of the study.

## 12.4 An alternative methodology – creating understanding, not models of causality

As opposed to approaches implicated by the positivistic paradigm, based on reduction, analysis and mechanical cause and effect relations, several authors suggest a more holistic approach to research. The case study is often chosen because it is interpretative, systemic and holistic, aimed to give full and rich descriptions (Gummesson, 2005).

> *Holism* may be viewed as the opposite of *reductionism.* The latter consists of breaking down the object of study into small, well-defined parts. This approach goes all the way back to the seventeenth century and the view of Descartes and Newton that the whole is the sum of its parts. This leads to a large number of fragmented, well-defined studies of parts in the belief that they can be fitted together, like a jigsaw puzzle, to form a whole picture. According to the holistic view, however, the whole is not identical with the sum of its parts. (Gummesson, 2000, p. 86)

> Progressively my mindset has adopted a view that life, including both marketing methodology and theory, can be seen as a network of relationships within which interaction takes place. Instead of searching for strict and partial causality, I search for the understanding of a systemic whole, a context, with individual and complex patterns of interactive relationships. (Gummesson, 2005, p. 322)

As Argyris *et al*. (1985, p. 36) put it, action science is to seek "knowledge that will serve action. The action scientist is an interventionist who seeks both to promote learning in the client system and to contribute to general knowledge." Gummesson (2000) presents a categorization of action research into societal action research that takes a social and political view, and management action research that focuses on the organization as a business.

The work of Carol Weiss (1977, 1980, 1986) has been summarized by Starrin (1993) including four different functions of research: the political, the instrumental, the interactive and the conceptualizing. Traditional, positivistic research is described as having an instrumental approach and function. The urge seems to be for more interactive and conceptualizing research, research that can be applied in organizations. Weiss (1977, 1980, 1986) describes the conceptualizing function and purpose of research as contributing with concepts, ideas, understanding and insights that can have an impact on how we relate and affect our standpoints. This is in line with Corbin and Strauss (2008), who describe the purpose of research, grounded theory in their case, as contributing to a common language through which researchers, professionals and others can come to discuss ideas and find solutions to problems. They argue, in an earlier edition, that "even a small amount of understanding can make a difference" (Strauss and Corbin, 1998, p. 56).

Based on the need for research that can contribute to the development of practical knowledge in the management field, a suggestion of an alternative case study methodology is presented in the following sections (see also Figure 12.2). The three overarching phases of the methodology are the same as in the traditional case study approach by Yin (2003), presented in Figure 12.1 above, but the emphasis and content differ.

In the suggested alternative case study approach, the "define and design" phase is shorter and based on the researcher's preunderstanding of the area of study rather than on previous research and theory. Using his or her

preunderstanding, the researcher is urged to identify relevant concepts of interest and make a purposeful selection of cases to study.

The second phase of "prepare, collect and analyze" includes iteration between theoretical sampling of data collection sources and data collection followed by coding and categorization of the data. The last phase of "analyze and conclude" starts with the interactive analysis of the concepts and categories inductively generated from the previous phase. The primary interaction is with management practitioners, preferably informants, during the data collection. The objective of the interactive analysis is a combination of academic and practical results.

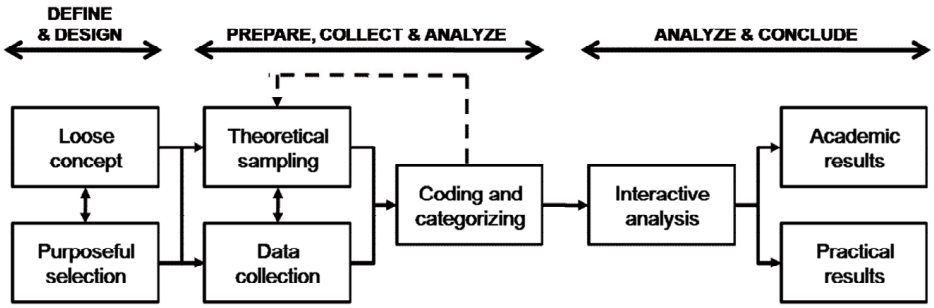


**Figure 12.2 – Suggested alternative case study methodology for management research.**

## Preunderstanding instead of a theoretical frame of reference and hypotheses

Several authors oppose the traditional argumentation, presented for example by Yin (2003), that previous research and theory should guide the formulation of research problems and the selection of cases and serve as a basis for data collection.

> We are all used to the normal, extensive literature review to ascertain gaps to fill in, hypotheses to test, and ideas to contribute to, in descriptive and verificational studies. In contrast the dictum in grounded theory research is: There is a need not to review any of the literature in the substantive area under study. (Glaser, 1992, p. 31)

> To begin with, readers can be assured that there is no need to review all of the literature in the field beforehand, as is frequently done by researchers

> using quantitative research approaches. It is impossible to know prior to the investigation what salient problems or what relevant concepts will be derived from this set of data. There is always something new to discover. If everything about a topic is known beforehand, there is no need for a qualitative study. Also, the researcher does not want to be so steeped in the literature that he or she is constrained and even stifled by it. (Corbin and Strauss, 2008, pp. 35-36)

> "There is a difference between an open mind and an empty head. To analyze data, we need to use accumulated knowledge, not dispense with it. The issue is not whether to use existing knowledge, but how". Further, they argue that "insights into data do not just occur haphazardly, they happen to prepared minds during interplay with the data." (Dey, 1993, p. 63 in Corbin and Strauss, 2008, pp. 32-33)

Glaser (1992) stresses how professional and private experience and in-depth knowledge of the area under study truly help to strengthen the researcher's sensitivity in handling the material. Corbin and Strauss (2008, p. 19) define sensitivity as "the ability to pick up on the subtle nuances and cues in the data that infer or point to meaning". The same argumentation is driven by Gummesson (2005, pp. 322-323), who argues that inductive research and grounded theory:

> let reality tell its story on its own terms and not on the terms of extant theory […] It may seem odd to ignore existing knowledge to be able to receive new knowledge, we are used to hear that knowledge is cumulative and that what we do must have support in previously published journal articles. Viewing all knowledge as tentative, however, researchers have to train themselves to listen to reality without preconceived ideas. At a later phase the results can be compared with existing concepts and theory and will thus proceed as an interplay between the inductive and the deductive.

Still, researchers have to be aware of their preunderstanding from prior personal and professional experience, values and knowledge. Individual preunderstanding will guide the research throughout the research process and should be seen as an asset rather than a burden. To develop the preunderstanding in the field of study, Gummesson (2000) suggests actively participating in a process rather than performing interviews or making observations – taking on the role of a change agent or consultant. Being a change agent or consultant might increase the access to information, thereby strengthening the fulfillment of an important quality criterion in management action research, according to Gummesson.

Miles and Huberman (1994) describe the need for researchers to describe their paradigm and preunderstanding because all choices in a research process are guided by the researcher's particular logic or conceptual lens – whether the researcher is aware of it or not.

## Loose concepts instead of defined research questions

Within the positivist paradigm, the research problem is traditionally viewed as external to the research process, guiding it in the right direction. By the interpretativist or constructivist paradigm, the research problem is seen as interior to the research process and being unfolded over time (Thietart, 2001, p. 36).

Starting off with a precise research question and most often a hypothesis, as suggested by Yin (2003), creates a behavior where the researcher goes out to look for what he or she thinks is "out there". The research will then focus on accepting or rejecting the ideas that the researcher has created from the preliminary theory constructed. If something turns up in the field studies of the reality that is not expected, that could be a risk. If the irregularity does not fit well into the case study design and protocol, it might be excluded.

Against the backdrop of Procrustean science, inspired by the Greek robber who had an iron bed into which those who did not fit either had their feet cut of if too tall or were stretched until they were the right length, Gummesson (2000) describes the risk of how science based on a hypothesis from one paradigm, to be tested through empirical studies, will narrow down the questions asked and the answers sought.

An alternative to the previously defined research question is proposed by Löwy (1992), who discusses the importance of loose concepts, a tentative area to study. Her case lies within the field of immunology, where loose concepts have allowed the development of stable "zones of interaction" between professional groups. She argues that loose "boundary" concepts play an important role in the construction of scientific knowledge and in the growth of a discipline. Boundary concepts facilitate heterogeneous alliances between professional groups, enabling them to "work together and to develop areas of efficient collaborations ('trading zones' or 'pidgin zones') without, however, obliging them to give up the advantages of their respective group identities" (Löwy, 1992, p. 391).

To initiate a research study with a loose concept of interest makes it possible for the research problem to emerge and evolve during the research process. The risk that the researcher has not grasped the true concerns experienced by the practitioners in the field of management, and thereby will conduct non-relevant research, is decreased by having an open mind about the area of study. The problems and delimitations will be discovered and defined during the research process. Examples of loose concepts used by the author are: “process management”, “the ability of development and renewal”, “systems management” and “career guidance”.

## Purposeful selection of cases as an alternative to statistical selection

Kalleberg (1993) differentiates between three types of research question: establishing, valuing and constructive. Establishing questions concern how and why things are as they are. Valuing questions ask what value a social reality has. The constructive research question asks in what way a group can and should act. To handle constructive research questions, Kalleberg (1993) suggests three empirical research approaches: the intervening, the varied and the utopic. Action research, categorized as intervening where the researcher herself intervenes, aims for two purposes: the development of new scientific research and implementing changes in the studied field. In the utopic approach, the researcher envisions an improved situation and works on how to advance towards it. Varied research is described as seeking knowledge and learning by studying variations in the reality, including studies of successful examples in the field of interest. One example of a varied research question is “What can and should American corporations do to become more competitive?”. The research performed by Rosabeth Kanter Moss (1983, 1990) presents examples of corporations with a high changeover ability. Based on this, she suggests recommendations for other organizations to adapt (Kalleberg, 1993).

Based on the argumentation by Eriksson and Krantz (2008) that knowledge of successful practical management is crucial for creating thriving organizations, in combination with Kalleberg’s (1993) proposal of the varied approach, the suggestion for case selection in a study according to the model in Figure 12.2 is to look at deviating, successful examples. This is in line with statements by Lincoln and Guba (1985) regarding a purposeful

selection instead of using the traditional approach of finding a selection of cases that is a statistical representative of a population.

## Theoretical sampling towards saturation instead of preplanned representation

Theoretical sampling is an expression used within grounded theory, implying that the selection of data collection opportunities – interviews, observations, documents etc. – evolves during the process, rather than being predetermined (Corbin and Strauss, 2008). The same idea also exists in qualitative research in general, usually called purposeful or purposive sampling. A challenge for researchers during data collection is to generate data reflecting different perspectives on the loose concept under study. The initial sampling aims to cover the case under study, with a representation based on the loose concept under study. If the case is an organization, for instance a successful example in line with a varied approach, data collection should cover the organization, including managers and employees at different levels, departments and, if applicable, different sites.

The process of simultaneous data collection, analysis and theoretical sampling, where the researcher jointly collects, codes and analyzes the data, will guide what sources are interesting and important in order to receive a full picture of the case under study (Glaser, 1992). Data collection might uncover opportunities for further interviews with practitioners having deviant opinions, opponents and supporters of different arguments who will bring a broader perspective to the study.

However, the data collection cannot continue forever. Where to end will be guided by saturation, another expression used within grounded theory. Saturation is a result of the diminishing marginal contribution of each additional opportunity for data collection. When the marginal utility of additional information, according to the researcher's perception, approaches zero, the researcher will not gain from continuing the data collection. It is important to be aware of the possibility that someone else, with a different preunderstanding, might be able to find further information (Glaser and Strauss, 1967).

## Data collection – open instead of structured interviews

In line with the principles of theoretical sampling, one of the cornerstones of grounded theory is that data collection and analysis occur in an altering sequence. Analysis begins with the first interview or observation, which leads to the next interview or observation, and so on. It is the analysis that drives the data collection (Corbin and Strauss, 2008). Gummesson (2000) describes the data collection as an ongoing sampling process where the researcher simultaneously collects, codes and analyzes data and decides along the way what to gather next and where to look for it.

A premier source of data in the proposed alternative case study methodology for management research is interviews. Gummesson (2000) suggests informal interviews, also called open interviews, where the selection of questions is governed by the actual situation of the interview. If the loose concept of a study is well chosen, it might often be enough to initiate a fruitful conversation at the start of an interview.

The open interview can be compared with the suggested approach in traditional case studies where structured or semi-structured interviews are used. The selection of questions is then guided by the proposition of the study: the preliminary theories and hypothesis, the narrow research question and the ideas of the type of results that are to be produced in the final report. In this case, one could argue that the answer depends on how you ask the question.

In addition to the above-described principles for data collection, it is important to bear in mind that alternative data should also be gathered during the whole process. Records regarding information such as the researcher's perception of the environments, how employees respond to each other or the process of booking the interviews might provide important clues to underlying behaviors in the organization. Gummesson (2005) describes what he calls "corporate anthropology", where the characteristic of long periods of study (several months or years) is borrowed from true anthropology. Inspired by anthropology/ethnography, data are collected through personal interviews and direct or participant observation documented not only in field notes, but also in photos, films and artifacts.

## Inductive analysis instead of known categories

The analysis of the data starts when the data collection begins; i.e. the processes of data collection, theoretical sampling and data analysis are simultaneous. When performing data analysis, it is important to keep a balance between creativity and discipline (Corbin and Strauss, 2008). Creativity is needed for the researcher's ability to ask stimulating questions, make comparisons, organize masses of raw data into concepts and categories and to name these categories. Discipline is needed to maintain professionalism, to be able to "listen" to the data and not to let prejudice and bias influence the analysis.

During data collection and analysis, the researcher's awareness of objectivity is important. To help control the infusion of bias, Strauss and Corbin (1998, pp. 43-46) have developed some techniques:

- Think comparatively – comparing data with other data, but also with literature and previous experience, helps to stay grounded in the data
- Use multiple viewpoints of events – gather data on the same events or phenomena in several different ways. Include varied data collection techniques and diverse informants
- Check your assumptions with practitioners – explain to respondents what you think you are finding in the data and ask them whether your interpretation matches their experience with that phenomenon or not
- Maintain an attitude of skepticism – all conclusions should be regarded as provisional and should constantly be validated against data.

The techniques described above are in line with, for example, Johannessen and Tufte (2003), who stress the importance of triangulation in social sciences. They suggest triangulation by looking at a phenomenon from different prespectives. If several sources of information, or several methodologies for data collection, show the same results, the trustworthiness of the results is strengthened (Johannessen and Tufte, 2003).

Figure 12.3 illustrates steps of data analysis already starting at the phase of data collection. During the process of data collection, concepts emerge

from the data. They could be areas of interest, problems or issues that are brought up during interviews or underlying patterns or behaviors that relate to the loose concept being studied. As concepts emerge, the researcher should continue to collect data to explore the concepts discovered further. Concepts are essential because, by the very act of naming phenomena, we fix attention on them and can begin to ask questions and examine them (Strauss and Corbin, 1998). During the data collection, concepts emerge continously. Glaser (1992) argues that emergence and discovery just happen, often in a way that is faster than expected.

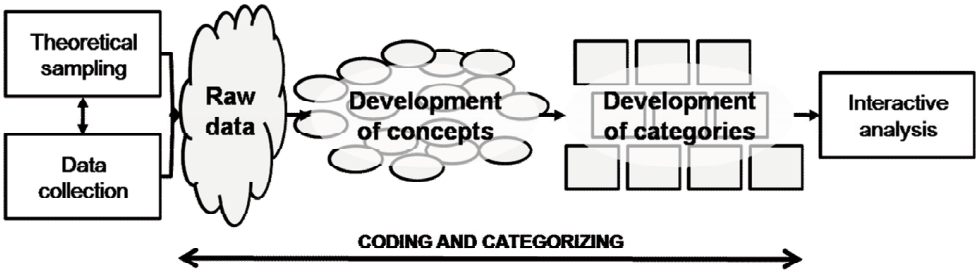


**Figure 12.3 – Data analysis – coding and categorizing.**

When saturation is reached, a phase of category development follows. The author often uses affinity diagrams to organize the material into categories. Usually, the observations and emerged concepts are transcribed onto post-it notes and sorted into themes that form categories.

Corbin and Strauss (2008) state that categories are abstractions that represent not only one individual's or group's story, but rather the stories of many persons or groups. These stories are reduced to, and represented by, several highly conceptual categories. Details are included under each category to give a fuller picture. The author usually works with "power points" where a category is expressed in a sentence as a headline and the underlying observations and concepts (post-its) are embellished in bullet points below. These "power points" constitute a basis for the interactive analysis that is performed in the next step.

Concepts and categories are developed using open coding. Glaser (1992, p. 15) describes it as the research process having "a fresh start, open to the emergent. One does not begin with preconceived ideas or extant theory and then force them on data." Glaser (1992) argues that the researcher must code for whatever category emerges on whatever unit in the data.

The use of open coding instead of predetermined categories is a considerable difference in methodology from earlier research performed by the author (see Palmberg, 2005). In a case study on successful organizations working with process management (Palmberg and Garvare, 2006), several elements of TQM described by Bergman and Klefsjö (2003) were used as predetermined categories in the analysis of the data. Reflecting on this approach and comparing it with the use of open coding in recent studies, a conclusion is that the data that fit well with the earlier categories became included in the analysis, but the data and findings that deviated or did not fit very well were hard to contain in the analysis. In this way, the analysis became almost self-fulfilling.

## Interactive knowledge creation with practitioners

An objective of interactive analysis is the development of knowledge and joint learning between the researcher and the participants, the participants being the management practitioners, who have preferably been a part of the data collection phase as informants. The basis for the interactive analysis is the result from the previous step – aggregated categories concerning the loose concept under study. A challenge of the interactive analysis is to make sense and understand the meaning of the categories in relation to the loose concept under study. Connections and relationships between categories that explain behaviors and events could occur during the interactive analysis. These relationships have the purpose of creating understanding and knowledge about the loose concept under study – not to explain or predict events in other cases than those studied.

Larsson (2006) describes interactive research as a perspective – a certain way of understanding and conducting research where "the involvement of participants in the analytical work is the essence of the interactive approach" (Larsson, 2006, p. 244). Her approach to interactive research is illustrated in Figure 12.4.

Larsson (2006) claims that the involvement of participants in the interactive analysis creates better theories – leading to new insights, unexpected explanations, an innovative perspective and new concepts and theories. She presents a process perspective on joint learning where the – sometimes seen as opposite – poles of:

- local, practical and uncritical knowledge, meeting

- general, theoretical and critical knowledge

can lead to a synthesis that represents a deeper understanding (Larsson, 2006, p. 255).

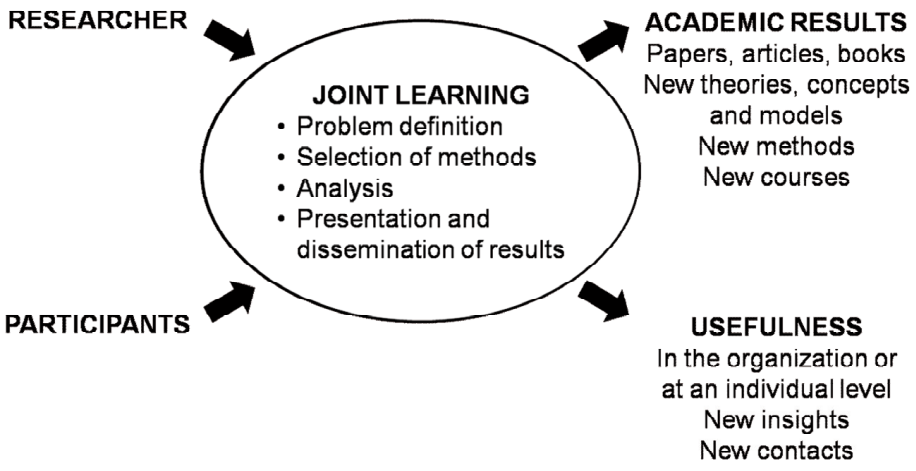


**Figure 12.4 – An interactive research process with different roles and interests (Larsson, 2006, p. 245).**

Furthermore, Larsson (2006) indicates that the involvement of the participants in a joint learning process might make it difficult to plan a research process in advance. This could be contrasted with Yin's (2003) approach, where the whole research process is thought to be planned ahead of the start of the data collection. The interactive approach opens up for impressions and ideas introduced and discovered during the research process. One of the purposes of the approach to case studies presented in Figure 12.2 is to open up for adjustments according to discoveries made along the way.

## Narrative descriptions instead of models of causal relationships

The studies of de Vall and Bolas (1980) point out that research that is easy to understand, uses everyday language and includes rich illustrations makes a larger impact on society (in Starrin, 1993) – something that should arguably be an objective for management research.

As stated earlier, the task of the action researcher is twofold: to contribute to science and to help solve practical problems (Gummesson, 2005). Figure 12.4 shows the two expected outcomes of a joint learning process of interactive research:

- academic results in papers, articles, theories, models and concepts, and
- usefulness on an organizational and individual level. (Larsson, 2006)

As an alternative that tries to embrace both outcomes, Gummesson (2005, p. 324) describes the idea of presenting the research results as a narrative description: "Narratives can be chronological but can also weave a web of events around various themes or concepts: story-telling. […] By presenting research as a story, we avoid the fragmentation that is inevitable when we break down networks of events into abstract concepts and categories."

## Case to case generalization instead of statistical or analytical generalization

The concept of generalization of research results originates from quantitative research and is based on sampling and probability theory. Firestone (1993) describes traditional extrapolation from sample to population – where a sample is drawn from an identified population – as one of three arguments for generalization. The other two are analytical generalization (or extrapolation using theory) and case-to-case transition. Analytical generalization is described as: "one uses the theory to make predictions and then confirms those predictions. In a specific study, predictions hold under specific conditions. If the predictions hold only under those conditions, they become scope conditions that limit the generalizability of the theory" (Firestone, 1993, p. 17).

Transferring findings from one case to another is made possible by the researcher providing a rich, detailed, thick description of the case and the surrounding conditions for the findings. The need for thick descriptions is to help the reader bridge the gap between the written case and the reader's reality where the findings should be applied.

Case-to-case transfer is considered as relevant to qualitative research, but it is seen as "unsatisfying to many researchers partly because it is unconventional, partly because the responsibility (and rewards) of drawing broader applications from a study are shifted to others" (Firestone, 1993, p. 18).

> If you have a good descriptive or analytical language by means of which you can really grasp the interaction between various parts of the system and the important characteristics of the system, the possibilities to generalize also from very few cases, or even one single case, may be reasonably good […] the possibilities to generalize from one single case are founded in the comprehensiveness of the measurement which makes it possible to reach a fundamental understanding of the structure, process and driving forces rather than a superficial establishment of correlation or cause-effect relationship. (Gummesson, 2000, p. 89 quoting Normann, 1970)

## Quality criteria for the management action research paradigm

Gummesson (2000) suggests that the quality of management research should be assessed in relation to the way research results are perceived to facilitate finding solutions to actual problems and that the management action science paradigm requires its own quality criteria. He suggests eight points of assessment that are in line with the reasoning in this paper (Gummesson, 2000, pp. 186-187):

1. Readers should be able to follow the research process and draw their own conclusions
2. As far as realistically feasible, researchers should present their paradigm and preunderstanding
3. The research should possess credibility
4. The researcher should have had adequate access to data
5. There should be an assessment of the generality and validity of the research
6. The research should make a contribution
7. The research process should be dynamic
8. The researcher should possess certain personal qualities.

The impact of the researcher's preunderstanding and paradigm is stressed in point number two. It might be argued that the traditional perspective on

research sees the influence of the single researcher as something negative that should be reduced to a minimum. The researcher is supposed to be independent, very much like a natural scientist performing experiments in a closed laboratory setting. In management research, the interaction with the practitioners of management is instead important (Lincoln and Guba, 1985).

## Reflections on the use of grounded theory in management research

Grounded theory is, according to Corbin and Strauss (2008), derived from data systematically gathered and analyzed through the research process where data collection, analysis and eventually theory stand in close relationship to one another. It is described as an approach where the researcher does not begin a project with a preconceived theory in mind, but with an area of study, and allows the theory to emerge from the data.

Jones and Noble (2007) express concern that the use of grounded theory in management research has become too pliant and flexible, that the methodology is losing its content and integrity. They describe a development towards "anything goes". To tackle this problem, they suggest that grounded theory studies should always employ major "foundational" procedures encompassing the joint collection, coding and analysis of data, theoretical sampling, constant comparison, category and property development, systemic coding, memoing, saturation and sorting (Jones and Noble, 2007).

The case study methodology presented in this paper meets these suggested requirements. Still, there are several elements in the original grounded theory methodology developed by Glaser and Strauss (Glaser and Strauss, 1967; Glaser, 1992; Corbin and Strauss, 2008) that are not covered in the presented case study methodology.

## 12.5 Summary and conclusion

The purpose of this paper is to discuss and reflect on new methodological choices for increased relevance of management research. Based on the argumentation by Eriksson and Krantz (2008), on the need for research able to contribute to the development of practical knowledge in the management field, a suggestion of an alternative case study approach, Figure 12.2, has been presented. The overall structure of the approach corresponds to the traditional case study approach as described by Yin (2003), shown in Figure 12.1, but the objective of the alternative case study approach is to be more open to, and driven by, the impact of practitioners.

To accomplish this in a systematic manner, several steps have been introduced. The use of loose concepts makes it possible for the research problem to evolve during the research process. The continuous selection of cases and the data collection opportunities are allowed to emerge during the process and are driven by analysis of the material. Open interviews are performed to explore loose concepts instead of being steered mainly by preconceived attitudes of the researcher and the prevailing theory of the field.

Further, the inductive and interactive analysis makes the research process more open for concepts to emerge from the data and for new explanations to evolve. This lends weight to the argument that the open and dynamic research process suggested should be able to facilitate increased relevance in management research.

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# PAPER 6

## Complex adaptive systems as metaphors for organizational management

Palmberg, K.

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# Complex adaptive systems as metaphors for organizational management

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## Abstract

**Purpose**: There is a need for the development of knowledge, metaphors and language for management of the new forms of organizing, for example value networks, which are evolving as a response to the increased demand for efficiency, flexibility and innovation. The purpose of this paper is threefold: (1) to explore the concept of complex adaptive systems (CAS) from the perspective of managing organizations, (2) to describe and explore the management principles in a case study of an organization with unconventional ways of management and (3) to present a tentative model for managing organizations as CAS – system management.

**Design/methodology/approach**: The frame of reference is based on a literature review of the area of CAS and an inductive and interactive approach is used to identify the management principles in the case study.

**Findings**: A classification of the components of a CAS is suggested and described as properties of and approaches for managing CAS. The identified management principles in the case study are: a clearly formulated mission, delegation of responsibility and authority, diversity and competition, and follow-up and feedback. As a result of analyzing the frame of reference and the case study, a tentative, conceptual model for managing organizations as CAS – system management – is presented including; metaphor, components of and approaches.

**Originality/value**: The case study contributes to the empirical body of knowledge of organizing and management. The tentative model is a contribution to the ongoing discussion about managing organizations as CAS.

**Keywords**: Complex adaptive systems, Networks, Chaos theory, Complexity Theory, Management, Case study, Metaphor.

**Paper type**: Research paper

## 1 Introduction – challenges for the organizations of this century

During the 20th century the development of production technology fundamentally influenced the society and the logic of business and organizations. In a similar way, the shift to the 21st century has been dominated by the development of information technology, affecting the way we communicate and the conditions for organizations, business and the production of goods and services. The consequences of the development of information technology include: increased interconnectedness, transparency, empowerment of individuals, speed of transactions, and decreased cost of information. These trends require organizations that can combine efficiency with flexibility and innovation (Cohen, 1999; Hamel, 2007; Sandberg and Targama, 2007).

To respond to the demand for flexibility organization forms are emerging that are assembled at short notice, for a limited period of time and a limited purpose, and then disbanded (Cohen, 1999). Products and services are produced in new constellations, in networks of actors. The ability to use both external and internal resources to solve tasks has become more common. Organizations are increasingly involved in these value networks or business ecosystems of which they have only limited control (Hamel, 2007). In this paper, the term *organization* includes the whole span from traditional companies to loosely connected networks of actors temporarily working together.

One of the challenges is to hand over significant control to people outside the company. The new organization forms challenge the role of management, the value of experts, the need for control over the customer experience and the importance of quality assurance (Cook, 2008; Tapscott and Williams, 2006).

Even though the organization forms are evolving, many of the existing principles for management have not changed significantly (Hamel, 2007, 2009). The principles of modern management, resting on the foundations of Fayol, Taylor and Weber, could be described as: *stability as the objective*, *analysis by reduction to parts*, and *cause and effect mechanisms between the parts*.

Almost twenty years ago, Senge (1990) described how managers have a language designed for simple, static problems at hand when facing the challenges of the current business environment of complex, dynamic realities. Still, the dominating metaphor of an organization is the hierarchical organization.

Morgan (2006, p. 4) argues that the use of metaphors implies a way of thinking and a way of understanding the world. There is a lack of metaphors for organizational forms such as value networks, mass collaboration, multiunit enterprises, and user contribution systems.

## 1.1 Complexity – possible metaphor for organizations?

Earlier analysis of organizations succeeding in implementing process management shows that functional and process structures co-exist, creating a dynamic matrix in the organization, see Palmberg (2009c, 2009d). Organizational complexity is increased rather than reduced in order to handle several parallel perspectives on the business. One can also argue that the development of increased interconnectedness, transparency, empowerment of individuals, speed of transactions, and decreased cost of information also contributes to the challenge of complexity.

How to manage complexity instead of reducing it is a challenge for the management of contemporary organizations. There are several authors arguing for the possibilities of applying ideas of complex adaptive systems (CAS) to managing organizations (Lissack, 1999). A CAS is defined as a set of interdependent agents forming an integrated whole, where an agent may be a person or an organization.

An example of an organization where several of the properties of CAS described in the literature are visible has been identified. The education system of Nacka municipality, Sweden, displays several seemingly unconventional ways of management. At the same time Nacka has received several instances of national recognition for their results.

As described above, there is a need for development of metaphors and language for managing of the new forms of organizing that are evolving. As an attempt to approach this challenge, the purpose of this paper is threefold:

- To explore the concept of CAS from the perspective of managing organizations.
- To describe and explore the management principles of the education system of Nacka municipality – a case study of an organization with unconventional ways of management.
- To present a tentative model of metaphors and approaches for managing organizations as CAS – system management.

# 2 Frame of reference – complex adaptive systems

Concepts that deal with complex adaptive systems (CAS) have many names: chaos theory (Tetenbaum, 1998), complexity theory (Smith, 2005), complexity science (Kelly and Allison, 1999; Stacey, 2003) and systems thinking (Senge, 1990). Ackoff (1999) argues that the general systems theory of von Bertalanffy (1968) where major stimuli for the awareness of the nature of systems and the implications of their nature for effective organizations and management.

In the following sections, two classifications are suggested for the components of CAS: (1) properties of CAS (see the left side of Figure 1) and (2) approaches for managing CAS (see the right side of Figure 1). The elements of each, i.e., the properties and approaches, will be presented. A more thorough description can be found in Palmberg (2009b).

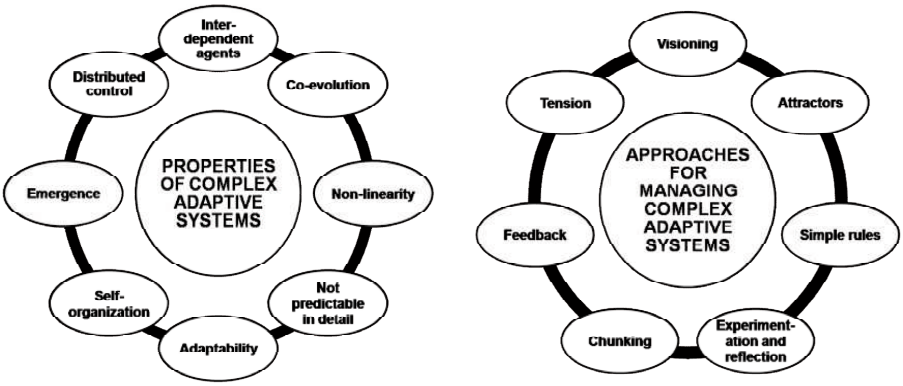


**Figure 1 – An overview of the properties of CAS (left) and approaches to managing CAS (right), assembled by the author.**

## 2.1 Properties of complex adaptive systems

According to Zimmerman *et al*. (1998), a system is a set of connected or *interdependent agents*, where an agent may be an organization, department, team or a person. Between the agents of a CAS exist dynamic, varying and *non-linear connections* and interactions (Augustinsson, 2006; Ng, 2009).

Organizations act and react in cooperation and in competition with other agents (*co-evolution*). Therefore, a CAS can only be understood in the context of its environment. It is by contemplating the whole, and the relationships and interactions between agents, that one understands a system: not by the absolute knowledge about each agent (Senge, 1990; Zimmerman *et al*., 1998; Richardson, 2008).

When analyzed, CAS are *not predictable in detail*, because of their interdependencies and non-linearity. However, it is still possible to find inherent order in the complex systems. Senge (1990, p.

290) makes the case that "The art of systems thinking lies in seeing through complexity to the underlying structures generating change."

CAS are seen as *adaptable*, which means that they have the ability to learn from their own experience and adapt to new, unexpected conditions (Zimmerman *et al*., 1998). Richardson (2008) defines the autonomy of each agent as the local memory of the agent and the ability to learn from his or her experience and to generate new responses.

Interdependent agents acting together will unwittingly create something new by *self-organizing*. For self-organization to take place, it takes a state of bounded instability; this state is often described as "the edge of chaos" (Kelly and Allison, 1999). Organizations use their cultural codes in the same way as biological systems use genetic codes to self-organize (Gharajedaghi, 1999).

*Emergence* is a property of a CAS that comes out of the interaction of many participants (agents) (Gharajedaghi, 1999; Lissack, 1999). Richardson (2008) states that emergence is often portrayed as a process whereby the properties of the whole emerge from the properties of the parts.

The property of *distributed control* is opposite to a hierarchical central authority, which directs all agents (Zimmerman *et al*., 1998). Senge (1990) calls this property localness.

## 2.2 Approaches for management of complex adaptive systems

A number of authors strongly argue that CAS cannot be controlled: see Cilliers (2000) cited in Augustinsson (2006) and Stacey (2003). According to Tapscott and Williams (2006), even though a CAS cannot be controlled, as is assumed in the approach of the traditional management of hierarchical organizations, a CAS can be managed. Deming (1994) states that a system must be managed, and that it is the job of the management to direct the efforts of all the components towards the goals of the system. A number of approaches for this will be presented below.

If any one idea about leadership has inspired organizations, it's the capacity to hold a shared picture of the future we seek to create – *visioning* (Senge, 1990). Another suggested approach is to use *attractors* (Gharajedaghi, 2007). It is argued that there is no such thing as resistance – there is only attraction. To change something, all one has to do is create stronger attractors than the ones in place. The basic idea is to leave behind the principle of managing through detailed instructions, which decreases the freedom of the individual agent, and, instead, to lead by making people embrace visions, creating attractors and stimulating individual agents and organizations to use their inherited abilities (Sandberg and Targama, 2007).

In 1986, Craig Reynolds was trying to program a computer simulation of a flock of birds. With the available computer capacity, it was difficult to make the calculations, since the birds expressed such complex behavior when flying. Instead, he created a simulation of autonomous agents (boids) whose behaviors were governed only by three rules (steering behaviors), which steer how an individual boid maneuvers, based on the positions and velocities of its nearby flock mates (Reynolds, 2001). His three rules were:

1. *Separation*: steer to avoid crowding local flock mates
2. *Alignment*: steer towards the average heading of local flock mates
3. *Cohesion*: steer to move toward the average position of local flock mates.

The remarkable thing was that, governed by these three *simple rules*, the flocks of boids could handle varying environments, which were filled with obstacles, without being controlled or steered.

> …it does show that simple rules […] can lead to complex behaviors. These complex behaviors emerge from the interactions among agents, rather than being imposed upon the CAS by an outside agent or explicit, detailed description. (Zimmerman *et al.*, 1998, p. 26)

While the traditional approach to problem solving is to start with an extensive analysis of the problem, the approach when managing CAS is to *experiment*. To take an issue that is overwhelmingly complex and start with small, simple experiments. Perform the experiments and *reflect* carefully. Adopt the good parts by dropping what clearly will not work and continue by linking the pieces that work together (*chunking*), and allow the solution to emerge.

*Feedback* is the action of feeding or reporting back the results of an action to the people performing that action (Kelly and Allison, 1999). According to Eurat (2006), feedback is accepted as a key factor affecting learning, cited in Augustinsson (2006). It is the concept of feedback that allows for emergence, self-organization, adaptability and learning in CAS (Richardson, 2008).

Just because the approach of simple rules is suggested above, it does not mean that everything should be simplified: in fact, just the opposite is required. Traditionally, in the industrial era, stability was a success factor among organizations. Today, with the pressure to remain innovative and flexible, managers instead need to create an environment of *tension* and instability. It is a challenge for managers to keep the tension level where it generates dynamic imagination without exceeding people's ability to handle the stress engendered (Tetenbaum, 1998). One approach to creating tension is to ensure that the organization is diverse (Zimmerman *et al*., 1998).

# 3 Research approach

The business environment keeps changing and there is an increased need for researchers to interact with organizations and managers to develop new knowledge on management. Sandberg and Targama (2007) make the point that the development of our society stresses the need for understanding. Weiss (1977, 1980, 1986) describes the conceptualizing function and purpose of research as contributing with concepts, ideas, understanding and insights that can have an impact on how we relate and affect our standpoints.

The use of case studies is becoming an increasingly important approach because of its ability to investigate little-known and complex phenomena such as organizations (Gummesson, 2000, 2007, 2008). Lee *et al*. (2007) argue that empirically based case studies have the potential to contribute to the development of both theory and practice. The case study approach used is further described in Palmberg (2009a).

## 3.1 Purposeful selection

Earlier studies of process management, both in organizational settings and in the literature, have shown that process management does not seem to be the full answer to how contemporary organizations should manage and organize their business (Palmberg, 2009c and 2009d). For this case study, an organization has been identified where process management is considered as necessary, but not sufficient. As a complement, several of the properties of CAS described in the literature are visible. The education system of Nacka municipality displays several seemingly unconventional ways of management, while at the same time receiving several instances of national recognition of their results.

Altogether, Nacka is a successful system with behavior and management principles that seem different from organizations studied earlier. Kalleberg (1993) categorizes this as varied research when seeking knowledge and learning by studying variations in the reality, including studies of successful examples in the field of interest. This is in line with statements by Lincoln and Guba (1985) regarding a purposeful selection instead of using the traditional approach of finding a selection of cases that is a statistical representative of a population.

## 3.2 Data collection

Starting off with a precise research question and most often a hypothesis, as suggested by Yin (2003), creates a behavior where the researcher sets out to look for what he or she thinks is "out there". An alternative to the previously defined research question is proposed by Löwy (1992), who discusses the importance of loose concepts: a tentative area to study. She argues that loose "boundary" concepts play an important role in the construction of scientific knowledge and in the growth of a discipline. To initiate a research study with a loose concept of interest makes it possible for the research question to emerge and evolve during the research process.

The question that guided the interviews in the case study was "What are the factors that have generated the success of Nacka's education system, in your opinion?" Throughout the interviews, themes and ideas evolved that were confirmed or dismissed in later interviews.

Interviews were held with both with local principals of both private and public schools and employees at the central administration. The Director of Education suggested names and sent the invitations to the interviewees. The result was eight interviews: three principals (two of private schools and one of a public school), the Head of Public Schools, three employees in the central administration of the education system and the Director of Culture and Education responsible for all the schools in Nacka. Each interview lasted for one to two hours and was documented with handwritten notes.

## 3.3 Data analysis

When all the interviews had been performed, the material was grouped in categories in an affinity diagram. The result was four categories representing the principles for managing the education system in Nacka (see Figure 2).

The next step in the case study was an interactive seminar with the respondents where the results of the analysis were presented together with the frame of reference of CAS. The purpose of the seminar was to verify the results of the analysis and to make a further analysis together. Larsson (2006) claims that the involvement of participants in the interactive analysis creates better theories – leading to new insights, unexpected explanations, an innovative perspective and new concepts and theories. The respondents confirmed the four principles during the seminar and signed off on the findings. The results presented in the case description below represent the analysis including the interactive seminar.

As stated earlier, the task of the researcher is twofold: to contribute to science and to help solve practical problems (Gummesson, 2005). The result of the case study has been spread across the education system in Nacka through several seminars, where the presentation of the material had been requested.

# 4 Case description of the education system of Nacka municipality

Nacka is a municipality with 85 000 inhabitants just outside Stockholm, Sweden. The municipality is responsible for schools, childcare, social services, libraries, parks, environmental, health and safety issues, planning for housing and workplaces etc. The study covers the education system with about 17 000 pupils from pre-school to upper secondary school (school year twelve). The education is provided through both private schools (31 percent) and public schools (69 percent).

In 2008, the education system in Nacka received an evaluation from the Swedish National Agency for Education, stating that the results were exemplary in schools and that the knowledge level among the pupils was above the average in the country.

In Nacka, each pupil (or the parents of under-aged children) has a choice of which school to attend, independent of geography. All the schools are financed by public funding that is distributed through an *education check* for each pupil, with equal amounts for all. So, the more pupils that choose a school, the more funding. If the pupil switches school, the funding follows. The purpose of the customer choice system is to offer the municipality's residents freedom of choice and direct influence over these services. Decisions on how the services are designed are taken by the providers of the services: the schools in this case.

The roles in the education system are, in brief: pupils, teachers, principals, central administration and politicians. The *teachers* are employed by their school principal. According to a majority of the respondents, teachers in Nacka are relatively well paid, sufficient resources are put into competence development and the turn-over rate is low in comparison with other municipalities. The *principals* are employed either by the Head of Public Schools in Nacka or by any of the organizations that run the private schools in Nacka. They have their responsibility delegated from the politicians and are fully responsible for their schools. The turn-over rate is very low among the principals in Nacka compared with other education systems.

The *central administration* of the education system is responsible for managing the overall educational system and exercising public authority. It is run by the Director of Culture and Education, the Head of the department and several employees. They are responsible for serving politicians with data for decision-making, for managing the education system through follow-up systems, customer surveys, supporting individual schools on request and providing parents and pupils with information about the schools.

The *politicians* are elected by local voters every four years and decide on objectives, charges, budgets and taxes. The education system is governed by the Education Committee responsible for goals, ambitions and priorities. It is expressed in the organization that the politicians set the vision and tone and then stay back and leave the operations to the professionals.

Nacka has chosen to work with several different forms of governance, employing a core value, vision, objectives and budgetary frameworks. Based on these, the municipality also operates in line with the guiding principles of: (1) separation of finance and production, (2) competition through consumer choice or competitive tendering, (3) competitive neutrality and (4) delegation of responsibility and authority to the lowest qualified level.

The *quality assessment system* is an important tool; the schools are continuously evaluated and compared. On a yearly basis, all the schools write a *quality report* including their results and planned improvements. A *customer satisfaction survey* is performed each year, with a response rate of 89

percent in 2009. Nacka is part of a partnership between municipalities in the Stockholm area where the schools are assessed in *peer reviews* by teachers and principals from other schools. Each school is observed about every third year and the observations and feedback are all made public. The *pupil results* in national tests and grades are all collected and displayed.

All the results are transparent and public, displayed in printed information material to the families and on the web in a *search engine* enabling the comparison of selected schools based on different variables.

The management principles of the education system in Nacka that evolved in the analysis are described in Figure 2. Each of the principles identified is described in the following sections.

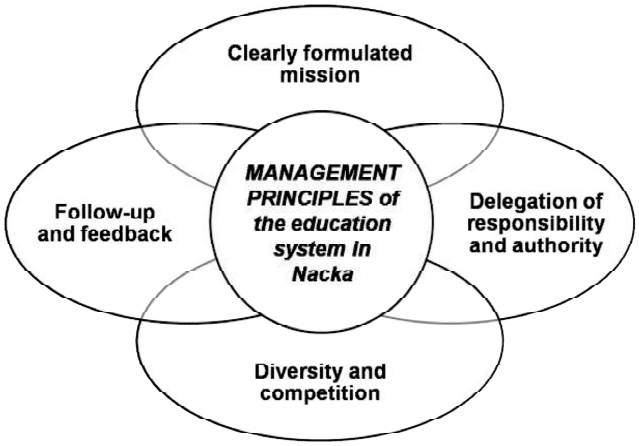


**Figure 2 – Management principles of the education system in Nacka.**

## 4.1 Clearly formulated mission

All the respondents state that the politicians and central administrators govern through visions and objectives, and not by becoming involved in the details of the operations. This is seen all the way down to the principals, who state their freedom to run the schools on their own. One of the administrators describes it as "no guidelines or telling the schools what to do – instead we try to create a system that favors certain behaviors". The roles seem clear between the politicians, central administration and principals.

Several of the respondents emphasize the impact of the rhetoric within the administration of education, and the consistence in the message that is communicated. Respondents, both within the administration and in the schools, describe the competitive spirit of the municipality: to be the first to try, to be the best and to compare results continuously with other municipalities. The stated confidence in the schools, principals, teachers and pupils is appreciated throughout the education system.

## 4.2 Delegation of responsibility and authority

One of the governing principles in the municipality of Nacka is the delegation of responsibility and authority to the lowest level possible. This is acknowledged in the interviews, and is articulated by both employees in the administration and the principals.

The feeling of responsibility creates creativity and will to change. (Principal, public school)

The intended core value is described as "Confidence in and respect for people's knowledge and their own capacities – and their willingness to shoulder responsibility". All the respondents refer to this as one of the reasons for the strong delegation. Several of the respondents describe the thorough recruitment of managers throughout the education system, both centrally and locally, as one of the reasons for keeping the core value alive.

To be able to have a strong delegation of responsibility, there is a need for a strong follow-up system; in Nacka, it is the quality assessment system. This is explained as enabling the politicians and central administration to delegate to the degree that they do.

## 4.3 Diversity and competition

The competition is described as enabling the decentralization and delegation of responsibility and authority, but also as a result of the customer focus in the form of the customer choice model. Of the compensation to the schools, 98 percent is distributed through the customer choice system; all the schools are treated equally and this is described as creating natural competition between schools. The customer choice system is set up using the principle of supply and demand. About 95 percent of the pupils should be able to attend their first-hand choice of school. The result in 2007 was 93 percent. Of the families, 98 percent use their right to choose a school, and the remainders are placed in schools based on geography.

The principals describe the education system in Nacka as a tough market to compete on. The parents and pupils use their ability to choose and move if they are not satisfied with the school. In this way, the customer choice system is self-decontaminating.

The principals describe the pressure from the parents and pupils as constructive. If a family has complaints, the principal is forced to deal with the issue, and if a solution is not reached, the school loses the pupil.

The diversity is reached by allowing any school to open in Nacka that fulfills some basic requirements. All pedagogical ideas are welcome and it is up to each school to attract pupils. The ideas that bring about good results survive. Neither the politicians nor the central administration are involved with the sizes of the classes, the material used or how the budget is planned. They rely on the parents and pupils to choose and stay in the schools that work and to move if they do not deliver good results.

## 4.4 Follow-up and feedback

It is described in the interviews how the politicians govern through setting objectives for which the central administration finds measures to follow up the results. The Director of Culture and Education explains it as exposing deviations, both those performing above the rest and those with poor performance. None of the management principles focuses on how the schools go about solving the challenges, and which approaches and tools are used; the focus is on the result.

> We govern through what is measured. There is much more governing happening than is visible. (Employee, central administration)

> What is achieved must stand comparison. (Head of Public Schools)

> The measurement is a way to find what is working and not. It increases our professionalism and we have to deal with the things not working. (Principal, public school)

The opinions differed a little between the respondents on the area of measurements. Some argued the importance of just measuring the critical things, that the measurements must be focused on the pupils' needs and that there is too much measurement going on. At the same time, several respondents stated that the strong delegation of responsibility demands a strong follow-up system, that the follow-up allows for the schools to track the results of their efforts and that the measurements build awareness of important areas and result in improvements.

On the question of what happens if a school does not want to share its results, all the respondents agree. Then, the "rows" in the comparison material on the Web and in written material are blank – and the parents and pupils base their decisions on the material available.

## 4.5 Learning and improvement

The central administration only has the authority to close pre-schools; the rest of the schools are governed by the Swedish National Agency for Education. When the results in a school do not meet the desired objectives, it is described how the central administration makes *disturbances*. A disturbance is explained as an intervention, often in the form of a visit from the Director of Culture and Education asking questions like "how will you tackle this?" and "do you need any support from us?" A lighter intervention that is described consists of inspirational speakers at conferences twice a year "to shed light on important issues".

The views on the common areas for learning and improvement between schools, such as the conferences, differ. The respondents in the central administration share a positive picture that the schools are cooperating and sharing ideas for improvements. The view among the principals is the opposite. They describe the management principle of competition as overruling any attempts for cooperation.

> It is in the nature of the competition that it is difficult to cooperate. I would never share a good idea with another principal, especially not a principal with a school in my neighborhood. (Principal, public school)

There also seems to be a tension between the public and the private schools. The public schools cooperate under the Head of Public Schools but the private schools do not have any forum for cooperation except the opportunities set up by the central administration for all schools.

When asked about the challenges to come, the respondents describe the increasing demands from parents and the decreasing number of pupils in the years to follow. Other challenges that are mentioned are: the increased need to search for new ideas and inputs, to improve the collaboration between schools, to increase the ability to use the data that the assessment systems generate and to keep the competence level high among all the employees in the schools.

## 4.6 Reflections on the results

With a background in quality management, I was initially looking for tools and methodologies as an answer to why the education system in Nacka had achieved its success. After three interviews, I started explicitly asking for tools and approaches and had the early findings confirmed: none of the interviewees talked about traditional tools and approaches when explaining their view on why Nacka had reached their results. Each school, or organization of schools, had approaches and tools for

improvement and learning in their own organization. However, the politicians and the central administration did not use tools and approaches to manage the education system as a whole.

When asked about the absence of tools and approaches, the Director of Culture and Education replied "if you understand your task, are normally capable and curious, you do not need centrally developed tools, you will come up with your own solutions to tackle problems that you observe". At the interactive seminar, the reactions to this finding were quite strong since several of the respondents have a background in the quality management movement. However, the discussions led to agreement:

> We have tools and approaches, but they are not mandatory and we do not manage through tools and approaches. (Head of Public Schools)

Instead, when managing the education system, the politicians and central administration in Nacka focus on the desired results and have a strong follow-up system. This enables the schools to choose approaches that fit their organization and management ideas, while at the same time allowing the politicians and central administration to define and manage the desired direction and development of the overall education system.

# 5 A tentative model for system management

In this section, a tentative model for managing organizations as CAS combining the frame of reference and the case study is presented. The model includes a suggestion for a metaphor of organizations as CAS, components of and approaches to managing organizations as CAS – system management.

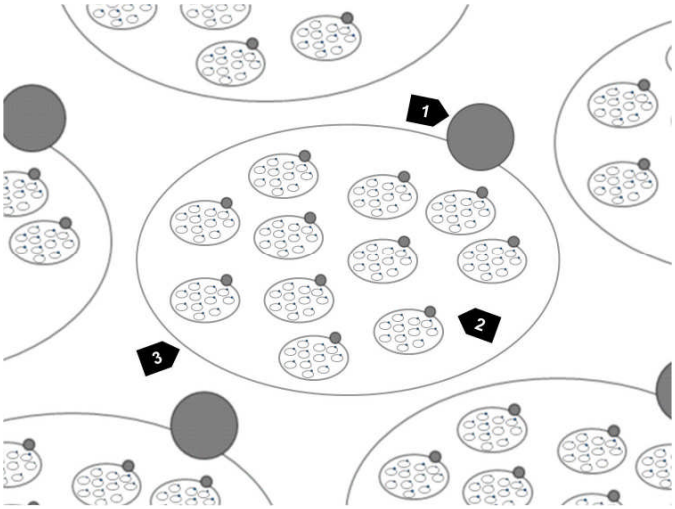


**Figure 3 – A metaphor of an organization as a CAS: (1) the system holder, (2) the interdependent agents and (3) the system boundary.**

In the introduction, the importance of metaphors and images was emphasized. Figure 3 shows a suggestion for a metaphor of an organization as a CAS containing: (1) the system holder, (2) the interdependent agents and (3) the system boundary. The symbol of the CAS is reoccurring; every CAS contains other CAS, each with a system holder, interactive agents and boundaries. The CAS is also surrounded by other CAS. In Nacka, each school is a CAS within the education system.

## 5.1 System holder

The task of the system holder is to manage the CAS. This task exists in all CAS that do not have a totally flat anarchical type of governance. Based on the analysis of the results, it is suggested that the tasks of the system holder when managing the CAS are: (1) visioning and setting simple rules, (2) building and maintaining follow-up and feedback systems and (3) creating attractors.

In Nacka, the system holder (politicians, the Director of Culture and Education and her staff at the central administration) uses the idea of *visioning and simple rules* within the principle of a clearly formulated mission and the way they do not get involved in details or how the schools set about solving their mission. The education system in Nacka is governed by the four guiding principles presented in the case description and these can be interpreted as simple rules with the purpose of guiding all the work in the municipality.

*Systems for follow-up and feedback* can be used to enable learning, self-organization and emergence. The better the feedback is, the better the possibilities and opportunities for reflection and reaction among the agents in the CAS. In Nacka, the quality assessment system strengthens the opportunities for learning and improvement.

According to the frame of reference, a system holder cannot enforce a CAS of agents to move in a certain direction, but one can build *attraction*. In Nacka, the transparency with which the results were displayed can be seen as one way of creating attraction. To have good results in the comparisons is attractive for the schools because that attracts pupils and thereby funding.

A challenge for a system holder is to keep up the tension level and the dynamics in a CAS. According to the frame of reference, tension is needed for the CAS to stay flexible and innovative. Nacka uses the customer choice to maintain tension among the schools through competition for pupils. Another way is the disturbances and interventions described. However, one could question whether the competition is enough to keep the schools "on their toes" when they have all reached a fairly good level of quality. In an education system with equally performing schools, what triggers agents to drive innovation when they are already good enough to keep up the inflow of new customers?

## 5.2 Interdependent agents

CAS are made up of interdependent agents, themselves CAS. The control of the CAS is to varying degrees distributed between the system holder and the agents. In Nacka, the delegation of responsibility and authority enables the distribution of control to the principals in the independent schools. Detailed instructions are replaced by visions and simple rules.

In Nacka, relationships between agents are defined by competition as a result of the customer choice. The competitive environment triggers the development of each school, but not the CAS as a whole. The competition may limit the possibilities of co-evolution and emergence between agents as the principals testify that they do not share ideas with other principals and do not cooperate.

It is a challenge for the system holder to make use of the form of organizing as a CAS instead of in hierarchies, processes or supply chains, and to take advantage of the interdependencies between agents and the distribution of control that enables development and innovations with little or no intervention by the system holder. One way of approaching this could be to create areas for collaboration, experimentation and reflection among agents, using attractors to gather agents, diversity among agents to create tension between ideas and chunking for the development and spread of innovations.

## 5.3 System boundaries

The metaphor of the cell membrane can be used when discussing the system boundary. It is a clear boundary while at the same time allowing the transportation of information, fluids and waste. The thickness of the membrane, the degree of definition, depends on the open or closed profile of the CAS. If the participation is open to everyone, the boundary is very vague. In Nacka, the education system is open for everyone to establish a school. Still, a school needs to be authorized by the central administration – the system holder. Therefore, the boundary of the education system is rather clear.

# 6 Summary and conclusions

Our ideas about how to manage organizations is formed and limited by our mental models and metaphors and these are often dominated by the functional organizational chart. There is a need for development of metaphors and language for managing of the new forms of organizing that are evolving, for example value networks. The paper presents possibilities of using the knowledge of CAS in developing the management of organizations. The frame of reference is based on a literature review of the area and a classification is suggested and described as; properties of CAS and approaches for managing CAS.

With the purpose of contributing to the empirical body of knowledge of organizing and management, a descriptive case study of the education system of Nacka municipality, an organization using unconventional management principles to govern, is presented. An inductive and interactive analysis is used to identify the management principles used: a clearly formulated mission, delegation of responsibility and authority, diversity and competition, and follow-up and feedback, see Figure 2.

As a result of analyzing the frame of reference and the case study, a tentative, conceptual model for managing organizations as CAS – system management – is presented, see Figure 3. The model includes a metaphor of an organization as a system, components of and approaches to management and is a contribution to the ongoing discussion about managing organizations as CAS.

A suggestion for future research is to explore further the possibilities of using CAS as a metaphor for organizations and develop approaches to managing organizations as CAS. There is a need for further research on how to drive innovation and improvement in a CAS with distributed control. The challenge of developing approaches for learning and improvement in a CAS is a possible step for the education system in Nacka to take on, to create attractors for collaboration and learning in a system governed by competition.

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