Research evaluation and organizational learning – a possible co-existence in the universities?

Finn Hansson
WP 19/2005
Abstract:

The paper will address the role of the recent implementation of systems of research evaluation in universities. The role of classic quality control system, the peer review, is to produce the most trustworthy knowledge and at the same time function as a learning system in a peer-to-peer learning process based on the norms of science. Scientific work was and to a large degree still is organized as a craft guild with an apprenticeship kind of training function for young scientists, who tacitly have accepted the authoritative hierarchical system normally associated with organizations one or two centuries ago. Recent studies of knowledge creation and learning in organizational learning theory have demonstrated the complexity of the process of knowledge in organizations. But in the university the very accidental and random model for learning is still state of the art, leaving the important learning decisions in relation to knowledge and learning to the individual scientist and not to the organization, the research group or the university. These individualized and unorganized learning systems are at the same time confronted with a much more systematically organized system of research evaluation. The basic question is what will become of the classic internal and tacit modes of learning science by day to day training of young scientists, when new models of research evaluation introduces new forms of governance in universities as a response to policy demands.
Research evaluation and organizational learning – a possible co-existence in the universities?
Finn Hansson / DRAFT sept. 2005

Introduction
Organizational learning has established itself in the last 15 to 20 years as a major dimension in the whole complex of organisational knowledge production. Starting from a basis in learning processes in organisations (Argyris & Schoen 1978) it has grown to become an increasingly discussed problem in almost any area of organizational studies and is an integral process in any dynamic knowledge organisation (Cohen and Sproull 1991). This has of course very much to do with the raise of the knowledge economy that made way for renewed interest in the role knowledge plays and always have played in the economy – a role first analyzed by Marx but then more or less ignored for several decades. The knowledge economy changed traditional discourses on what made the economy grow and after an interplay with a dominating discourse of knowledge bound up on a more or less linear understanding of how knowledge was produced and introduced into organizations - as in the models of national innovation systems, the more complex and complicated aspects of making knowledge useful in organizations was raised.

The aim of this paper is to take the theory of organizational learning and especially the central problem of organising and managing learning processes from its origin in studies of knowledge producing firms and organisations and confront it with the most classic and oldest knowledge organization in modern society, the university. How has the university dealt with the upcoming process of organizational learning and knowledge creation?
One of the first impressions of the role of the university in today’s fast changing economy is one of stability and resistance to change (Martin 2001, 2003). The university in today’s knowledge economy is in many institutional aspects not very different from the university of the early 19th century. In his famous lecture “Science as a Vocation”, Max Weber (1972/1919) put forward his anticipation of coming of a new organisation of universities, based on state-capitalist, bureaucratic principles in his eyes already visible in research universities in the USA in his time. Weber discussed the new demands on the role of the modern researcher stressing that being a scientist or researcher is a vocation or job not so different from other
demanding jobs like being a successful business man (Weber 1972/1919, Hohendahl 2004). In 1990 Hackett presented an empirical analysis of the evolution university based research in the last part of the century since Weber presented his basic arguments. Hackett summarises the developments as follows:

“Universities have become more dependent on external agencies for material and cultural resources such as research funds and legitimacy. ... Thus, changes in the university's connections with its environment have had consequences for its internal structure and functioning. Less apparent are the consequences of such changes for the culture of academic science. The "received" values of academic scientists - those values acquired during their education and professional socialization - are in conflict with the values embodied in and required by their new conditions of work.” (Hackett 1990, 249-250)

Hackett describes some of the consequence of observations of deeper structural changes in the societal use of knowledge explicit using the metaphors and ideas from Webers prediction of the university becoming a bureaucratic-capitalist organization (Weber 1972/1919). But this picture of changes in the functioning of the university is partly misleading because it paints some of the recent changes against a romantic picture of the Humboltian university model of the 19th century. Changes in funding of research and in policy relations to the broader society has always been the reality of universities does not necessary imply large scale changes in the functioning of the university (Martin 2001, 2003, Godin and Gingras 2000, Hohendahl 2004). And as a consequence of changes in society over year’s values, norms and expectations of the people recruited to the university changes too. What is important in is the last part of the quote about changes in scientists’ value system. Recent discussions of consequences of the changing role of knowledge in modern society for the knowledge production in universities have focused on external induced changes in the university and the relations to the wider society either as the upcoming of the entrepreneurial university (Clark 1998) or a more organized cooperation with industry, the Triple Helix (Etzkowitz & Leydesdorff 2000).

But the focus on the these large scale institutional changes, reorganizations or rearrangement, should not divert our attention from the internal operation of the systems of production and quality assessment of scientific knowledge developed over a period of almost 200 years in and around the university. How is the public funded university of the 2nd millennium handling questions of organizing and managing research? The long tradition for autonomy in
science has maybe for too long guarded universities from interventions in their internal management systems and protected established traditions for knowledge production from outside pressure (Blau 1973). Exactly this independence is opened for questions in the knowledge economy where interdependency, networking and complexity are the rule much more than independence and isolation. The development of late modernity has challenged old structures of authority of knowledge in society and the monopoly position of universities. Production of new trustworthy knowledge in late modernity has undermined the controlling hands of the traditional monopoly, the university (Beck 1999, 2003).

In the literature analyzing the changes in the knowledge producing systems of modern society, the growth of organized application of scientific knowledge to social and economic innovation and the embodied social institutions is discussed by tree different but important positions: The first position is the National Innovation System Theory (Lundvall 1992, 1997, 2002, Boden 2004). Starting in the 70ties it has especially been important for the development of science and innovation policy and for the establishment of a number of innovation institutions (science parks). It is probably more truthful to present this approach as a cluster of theories combined through a clear and common goal than to present it as a singular theoretical approach. The National Innovation System Theory approach operates very much on the level of the nation state or large regions and with a concept of a coherent system of knowledge and innovation. Through an extended use of quantified statistics it has demonstrated how differences between nation states and regions in regard of science and innovation results can be related to differences in policy and investments. On the other hand this approach has to a large degree left questions related to the content and application of scientific knowledge, as well as how it is organized and structured untouched, theoretical described as a black box. Starting out from the black box system of innovation, the next approach has tried to analyze the institutional relations in the system. The theory of Triple Helix (Etzkowitz & Leydesdorff 2000, Etzkowitz et.al. 2000, Etzkowitz 2002) from the late 90ties is a theory trying to analyze the relations between universities, government and industry in relation to production and dissemination of knowledge especially oriented toward innovation and economic growth. The theory is partly based on a system theory approach and it attempts to combine the relations between three systems with very different internal systems logic. By stressing the relations between the systems and focusing on policy to enhance these relations the theory can be viewed as a modernization of the theory of innovation systems but does not offer more
exploratory insights into the more complex aspects of the growing knowledge production and application.

The opposite can be said about the last position, the theory of mode 1 and mode 2 knowledge productions. Introduced by Gibbons et. al. (1994) the changing structure of scientific knowledge production and the shift in the relation between science and society is the core of this approach. In the follow up by Nowotny et. al. (2001) they reformulated the concepts of modes and introduced the agora as the evaluative melting pot between science and society.

The distinction between mode 1 and mode 2 knowledge does not equal the classic differentiation between basic research and applied research, even if the application dimension is important. The differentiation between the two modes is the degree of involvements of external interest (society) in the knowledge production and evaluation and structure of the knowledge process. Mode 1 picture the classic academic disciplinary knowledge system, solely organized in specialized institutions (universities) while mode 2 is transdisciplinary, based on new forms of cooperation (networking) in the knowledge production including new partners. The concept of mode 1 and 2 has been criticized for lack of empirical evidence and a demonstration of how to empirically differentiate the two (Shinn 2002, Weingart 2000, Fuller 1995, 2001, Jacob & Hellström 2001, Audetat 2001, Hicks 1996, Godin 1998). Much of the critique is very relevant especially regarding the lack of a more systematical demonstration of the empirical content of the two core concepts and the assumed historical tendencies in the theory (mode 1 being replaced by mode 2). Nevertheless the central ideas from the theory of the two modes and the whole chain of arguments for the upcoming of new structures in knowledge production seems to be very much in line with both central ideas in general social theory discussing modernity and the role of experts and knowledge (Beck 1999, 2001, Beck, Lash, & Giddens 1994). Just as important is, that the theory of changes in knowledge production fits very well with the focus on social relations development in organizational studies of knowledge production during the last 10 years, (eg. Brown and Duguid 1998, Nonaka 1994, Nonaka. & Konno 1998).

Both the discourse on modernity and knowledge in organizations operates from a basic understanding of the complexity in the relations between knowledge and its social and organizational conditions. The focus on complexity is on knowledge-in-context, in the organization as well as outside in networking relations in the new organizational approach to knowledge production, and in the theories on modernity discussing the role of scientific knowledge in modernity. Both theories attempts to take into account the relations to the role
of professional producers and users of knowledge, the experts, the content of knowledge as well as the many old and new stakeholders in knowledge. The importance of the context for what counts as knowledge as well as the production and function of boundaries between knowledge and non-knowledge (Gieryn 1983) and the whole process of construction of knowledge has now gained a central position meaning that systems for quality assessment or evaluation of research is getting a new and important role.

To conclude the discussion of these three perspectives on science and innovation in society they all presents arguments for a rethinking of the classic model of scientific quality control in different ways and with different accents. Both the innovation systems theory and the theory of Triple Helix have introduced the organized relations to users of scientific knowledge. Only the theory of mode 1 and mode 2 has potentials to go a step beyond the systems perspective and introduce the changes related to organizing the scientific knowledge production. The critique against the Mode 1 and Mode 2 discourse conclude that this discourse has opened a number of very important problems related to scientific work in universities in late modernity but a vast number of questions remain to be solved. One of the most important among these are the questions of the consequences of these changes for the traditional organization of scientific knowledge production in universities.

Having set the stage to discuss problems in relation to managing and organizing the knowledge production in public universities, the rest of the paper will address in detail the role of the development of systems of research evaluation. The role of classic quality control system, the peer review, is to produce the best possible knowledge and at the same time function as a learning system in a peer-to-peer learning process based on the norms of science. Scientific work as an apprenticeship kind of training function tacitly based on the general framework of the scientific. In the light of organizational learning theory, this is a very accidental and random model for learning leaving the important learning decisions to the individual scientist and not to the organization, the university. This learning system is organizational weak and in everyday practice very much the result of dilemmas between handling different demands (Blau 1973). Today it is confronted with a much more systematically system for research evaluation, a system much broader in its scope that the classic peer review – even if some of the system has kept the original label. The basic question is then what will become of the classic internal and tacit modes of learning science by day to day training, when new models of research evaluation introduces new forms of governance in universities as a response to policy demands.
The university and the classic scientific quality control system

Research evaluation as an anonymous and autonomous system of quality control in science and research, based on an evaluation by peers (i.e., the peer review process) of a specific piece of new knowledge, is as old as modern science. But during the last ten to twenty years the field of research evaluation has developed rapidly, and today it is most adequately described as a highly diversified field in terms of methods, actors and goals. Methods and approaches from social science and information science are combined with the peer review model and with quality control and assessment systems. The classical peer review process has either an independent existence or it is combined with other systems in the evaluation of research. But this diversity is not only in methodology or procedure: both the object and the goal of evaluation also vary extensively. The object of evaluation can today be anything from the scientist to the institution to the nation state and the goals vary between organizational learning, accountability, and control (Foss Hansen and Borum 1999). The role of the evaluator, too, is no longer restricted to groups of scientific peers but includes a growing number of professional evaluators or consultants and, in some cases, political representatives and lay persons (Frederiksen, Hansson and Wenneberg 2003, Nowotny et.al. 2001, Arnold and Balasz 1998).

According to classic Mertonian sociology of science, quality in research is defined operationally as the outcome of the evaluation of a certain piece of knowledge (paper, product, patent) from the scientific community, e.g., based on the peer review process (Hansson 2002, 2003). The scientific community of one’s peers is itself understood to be divided into special disciplines, each with their own particular standards and norms, but the evaluation is originally based on what can be described as the universal norms for scientific work that are rendered operational within each discipline. Merton defined the effect of the CUDOS norms as the norms for scientist behaviour in the international scientific community (Merton 1973).

The point is that the pros and cons of the classic peer reviews has been more or less known and accepted by the scientific community, because the pros were so important and nobody could imagine a substitute for the peer review system. In the words of Merton and Zuckermann, the independent peer review system is the backbone of the evaluation of quality in science and research.
“Errors of judgement, of course, occur. But the system of monitoring scientific work before it enters into the archives of science means that much of the time scientists can build upon the work of others with a degree of warranted confidence. It is in this sense that the structure of authority in science, in which the referee system occupies a central place, provides an institutional basis for the comparative reliability and cumulation of knowledge.” (Merton og Zuckermann 1971 s.495)

We have here the classic picture of a community of science as a rather closed social system sequestered from society with its own set of specific and somewhat disenchanted social norms. The CUDOS norms guarantee the quality of the knowledge products through the control of the publication of results in scientific journals. The peer review evaluation system is crucial to the overall operation of this system

Basic questions to the core argument of disenchantment, i.e., of the idea that science is not caught up in ordinary social processes, has come from a long series of now classic ethnomethodological and phenomenological studies of the daily life and work practice of scientists in laboratories (Latour and Woolgar 1986, Knorr-Cetina 1981, 1999). The close focus on micro processes in these studies, however, has as a consequence that these studies primarily operated in what Bourdieu labelled the cognitive dimension of scientific capital, leaving the two others almost dimensions, the social and the institutional, almost untouched. Mayntz and Schimank (1998) argue that they did not contribute much to a new explanatory theory of the role of the evaluation system in science and society. The system dimension is important because it is through the science system the distribution of scientific prestige, and accordingly power, is operation and is more or less controlled by scientific organizations. For the scientist it produces a system of professional autonomy depending on the degree of monopolized control that is levied by scientific organizations (Fuchs and Turner 1986, Whitley 1984). Looking at science as an organizational system or activity with its own norms and tradition emphasises the role of the organization of labour and its relations to the surrounding society. The role of the organization in science and its highly differentiated operation in different scientific fields has been demonstrated (Whitley 1984) and from an organizational perspective, the Mertonian norms are only a part of the social system that produces and reproduces scientific knowledge. Following Bourdieu (1991, 1998, 2004), we can say that the scientific capital controlled by a scientist is produced by a combination of the power of reputation, that is the personal scientific capital where the Mertonian norms are
central to the habitus of the scientist and the institutional power to control of economic funds and other resources or the organisational scientific capital. What seems to be missing in Bourdieu's discussion of the dimensions of scientific capital is how the relation between the two is to be understood. It might that the case study of INRA where Bourdieu (1998) developed the specification of concept of scientific capital in most detail did not pose the problem of the dynamic relations between the institutional and the cognitive dimension. Nevertheless this is a problem for a more dynamic understanding of how research organisations function. One way to solve the theoretical problem and keep the original approach by Bourdieu is to use recent theoretical development in organisational theory. One of the major new concepts in organizational theory is that of communities of practice originally developed by Brown and Duguid (1991) based on empirical studies of work practices and collaboration in different knowledge producing or creating organisations. Their studies tried to explain and explore observations of unexpected and informal kinds of cooperation and distribution of knowledge between members of an organisation – exactly the point missing in order to combine Bourdieu's very dynamic concepts of cognitive and institutions dimensions of scientific capital. The social link of strong and weak ties (Granovetter 1973, 1983) can then be relabelled to social scientific capital.

The theoretical concept of scientific capital with its three dimensions can now be used as a frame of reference combining the dynamic relations between the different dimensions, when we try to discuss the consequences of the multilevel impact of research evaluation systems in science.

- What are the consequences of the changes in the role of research evaluation and, not least, of the appearance of many new evaluation methods for the traditional quality control of knowledge in the modern public research organization?
- What constitutes quality, how is quality evaluated, and who decides? What is the role of the science community, the research organization and management in this new situation?
- Have the quality dimensions in research changed and how can we measure or evaluate the quality of research if not by traditional peer reviews?

Even if the following discussion attempts to produce a critical analysis of some major contradictions in the way modern research organizations perform evaluation procedures, the aim here is not to argue for a reconstruction of the former sovereignty of the science community in society leaving all questions about science and research to the disciplinary
scientific communities. The social and political embeddedness of science today is beyond question (Beck 1999) even if science often has and to an astonishing degree still argues for the superiority of knowing in all fields.

**Research evaluation as governance**

Recent developments in science policy have focused on the relation between quality and costs, using evaluation methodology in attempts to improve the distribution of resources to research in cost-benefit terms in order to improve quality. The issue of research quality has become central to any discussion of the evaluation of science and research, making it necessary to try to define the hitherto vague and traditionally undefined concept of quality (one that was based on a disciplinary agreement by peers) in terms that are now operational also outside the specific scientific community. Many of the new evaluation methods and approaches have been introduced, developed and put into use to evaluate public and semi-public research organizations in order to accommodate at least two, often contradictory policy goals, the demonstration of accountability and productivity of the researcher and the research organization (Hansson 2002). The evaluation methods vary from qualitative participative studies over classic peer review studies to the use of benchmarking and best practice studies. Especially the introduction of new actors from outside the scientific community (politicians, lay persons) signal the growing social and political role played by science in modern society as well the democratic demand for influence and control with the once closed and authoritarian science community (Irwin 1995, Wynne 1994).

New standards for evaluations that are very often oriented toward performance management have in the last 10 years been introduced in the field of research evaluation in universities. In the day-to-day practice of individual researchers, the peer review system is as important as ever as a system to control of quality of research, serving as a form of self-regulating quality control and constituting a vital part of the legend of science (Ziman 2000). The peer review system produces a special kind of traditional governance based on the recognition of quality and related to the traditional norms of science (Merton 1973, Hansson 2002, Kostoff 1995). In the classic model the university operates on the assumption of autonomy in relation to the greater society and the consequences of the peer review process on the researcher is then considered to be the individual researcher’s own problem. But the peer review system is slowly but steadily being transformed, integrated and combined with other quantitative types
of research evaluation that target performance measurement and accountability and are already operating (Hansson 2002, Whitley 1984). They are based on registration of productivity by quantitative indicators like science citation indexes and impact factor counts. The introduction of new forms of governance highlights the question of how these systems influence on the behaviour of the researcher and from the point of view of the single researcher how these systems are changing the whole research organization. According to Brunsson and Jacobsson (2000) the implementation of a set of standardized procedures in professional organizations often results in unwanted and destructive consequences in relation to the existing professional norms and values in the organization. The attempt to de-couple the audit process into separate units or sub-parts of the universities has rarely been successful, often producing a number of inconsistent demands in the university with the result of a growing organised hypocrisy (Brunsson 1998, 2002). From the view of the audit system Power comments that (1997) “external audit process [is] rarely sealed off from the rest of the audit organization, despite strategies with that intention”. The main objective of highly formalized audits or evaluations of research are, like the goal of other NPM programs, the colonization of the organization. The idea is to “challenge the organizational power and discretion of relatively autonomous groups, such as doctors and teachers, by making these groups more publicly accountable for their performance.” (ibid. p. 97) The next part of the paper discusses the abovementioned changes in research evaluation in relation to the behaviour of researchers. In the age of rising public involvement in what used to be internal matters of science and science policy demands for accountability, openness and permeability is legitimate also in relation to science and scientists (Irwin 1995, Wynne 1994, 1996).

**Changes in research evaluation.**
These questions place the organization, not the individual researcher, at the centre of the evaluation. Research evaluation has always had a power dimension – somebody evaluating somebody else’s work -- and it has always been through a hierarchy based on power and knowledge. But power and hierarchy in the peer review system was always more or less separated from the research organisation. This has changed dramatically, and as Bozeman et. al point out, research evaluation no can longer function without taking into account the social context or organisation of the scientific work.
“The evaluation of science requires an approach in touch with knowledge of the social context of scientific work. An S&T human capital model is first a model of scientific work and its social qualities (Rogers and Bozeman, 2001); the evaluation methodology flows from this more fundamental conceptualization. Much of this capital, especially that aspect that is interpersonal and social, is embedded in social and professional networks, technological communities or knowledge value collectives. …. none of these discounts the more traditional aspects of individual scientist’s talent, … Our concept simply recognizes that in modern science being brilliant is only necessary, not sufficient” (Bozeman, Dietz and Gaughan 2001 p. 724).

The argument by Bozeman et al. (2001) on recent changes in research evaluation builds without explicit references on the concept of scientific capital by Bourdieu and underlines precisely the importance of ‘interpersonal and social’ aspects of the concept of capital including the necessity of understanding science and research as integrated in social and organizational contexts that include the process of evaluating research quality. The understanding science and research activities in the context of the whole research organisation will force us to make the question of governance or institutional power (Lukes 2005) in research evaluation very visible also in relation to the evaluation. The introduction of a broader, more systematic and more reflexive understanding of research evaluation than the classic product-based approach (reviews of articles, publication lists etc.), with its rather simple concept of power, implies changes in the concept of governance. By construing the evaluation process as an integrated part of the whole social and organizational context of scientific work, as part of its social capital so to speak, evaluation of research comes into its own as one among many elements in the total process of governing researchers and scientists.

The development of new forms of governance in research evaluation in public universities proceeds in the shadow of the implementation of New Public Management evaluation systems. It means evaluation by instruments of formal control like productivity measures by quantitative indicators (ISI impact factors, citation counts, quality journal lists), monitoring systems, quantitative comparisons between units (benchmarking), productivity compared to costs by quantitative productivity measures, cost-benefit analyses, cost efficiency testing and the use of TQM and other formal quality assessment systems. A number of studies has argued for the necessity of the implementation on a total scale of quality control systems (tqm,
performance management systems) in public as well as private research organizations (Boath and Bodnarzcyk 1995, McLaughlin 1995).

The kind of governance that is produced in the research organization by the steady growth in the use of these systems is one of individual control and constant monitoring of productivity, and is based on a certain amount of distrust between the different actors in the organization. The new focus on organizational supervision and scientific productivity, based on a number of evaluation indicators is directed toward every individual researcher, from the young PhD student to the tenured professor in the organization, and even if we are still many steps away from describing this control in terms of Foucault’s panopticon, the role of evaluation in these settings are much more directed toward accountability than learning and contains huge risks. Here are some of the more critical consequences for governance in science and research:

- Risk reduction behaviour by scientists with a subsequent reduction in the production of new knowledge,
- A tendency to work inside well-defined or traditional fields with the effect of narrowing horizons to traditional disciplines instead of encouraging transdisciplinarity,
- A strong relation between productivity and expenses fosters ‘budget thinking’ behavior in organizations and individual researchers,
- A university organization requires a lot of specialized but not so easily measured ‘craftsmanship’; what are we to count as productivity in evaluations?

The critical listing of unwanted, unexpected or latent functions of the implementation of large scale systematic use of formalized evaluation systems in the modern public research organization has to be confronted with the discussion taken up earlier in the paper on the necessity of understanding the critical view of the uses of evaluation in public research organization.

This discussion has so far tried to demonstrate some of the more problematic and dysfunctional consequences of what may be an overhasty implementation of quantified research evaluation systems in the public research organisation as an instrument of organizational development. The use of evaluations based on quantified information systems (indicators, citations, publications) often have an unwanted disciplinary influence on the
researchers, forcing research behaviour toward conformity and reduced risk taking. The difficulty here, of course, is that just throwing away these types of evaluations is not a viable solution, even if it is easy to find researchers who long for ‘the old days’ and perhaps forget their dependency on very hierarchical and personal relations in the organization. The core of the problem is that the research organization must be subject to some form of management in order to produce the best possible quality of research because of the growth and complexity of the organization and its relations to other organizations through networks. But the list of consequences does not include the question of organisational learning in scientific work. Normally one would expect some element of learning as at least the official by-product of internal evaluation systems (Love 1991, Sonnichsen 2000, Leeuw et. al. 1994). So, returning to the opening formulation of the central role of organisational learning in modern knowledge organisations, something seems to have gone wrong with the original close relation between peer evaluation and learning in science. Is the control-based use of research evaluation a necessary consequence of a need for more organized management in universities following the growing complexity in the research organization as Boath and Bodnarzycyk (1995) seems to argue or is other options possible?. In order to discuss alternative solutions to the problem of managing and organising learning among scientists in modern organisations, not forgetting the problem of organisational learning, I will discuss the possibility of more differentiated and less formalized to research management based on the results from a case study of research management and evaluation systems in two well-established Danish research-based companies, both with a long successful story in their respective research area.

Lessons from private research firms:
A case study of two private research-based firms with a long tradition for investment in research and a dominant position in their respective field constitutes the background for the following discussion. The aim of the case study was to investigate the effect of

---

1 The information on research management practice and evaluation systems was collected through a number of interviews with young researchers, senior researchers, research project managers and research managers, all conducted by the author in the form of an open dialogue. in 2001 and 2002. Each interview lasted from one to one and a half hours and was recorded on tape. Supporting notes were taken during the interview. The tapes were then partly transcribed with the help of notes and analyzed in four major themes: quality in research and development, research evaluation in organizations, evaluation of the researcher, research management. The study is published in Hansson 2003 (in Danish).
organizational factors on the various quality assessment or evaluation procedures used in research organizations. Hence the unit of the study is the research organization and not the individual researchers\(^2\) or the firm as such.

- NKT is a company offering basic products in cables and wires, more recently also electric equipment and IT equipment. The company has recently restructured their research department NKT Research & Innovation, changing its size and scope; optical fibres and life science equipment are the new strategic research areas.
- Haldor Topsoe is an old chemical company specializing in environmental technologies, especially catalysts, and has a comparatively large research and development department, with a remarkable stability in personnel.

Both companies produce on a regular basis articles to scientific journals in their field and have an extended collaboration with university departments worldwide.

How do researchers and research managers in the private research organization describe their own experience with the complexity of evaluating and managing their scientific work in the competitive atmosphere of a private company? One of the most interesting results from the study was the clear and repeated statement from both researchers and research managers in these private firms about how important it is for a research manager to have a solid scientific background in the field or in related science fields. Most found that having the scientific background was a mere necessity of in order to be able to participate effectively in the person to person interaction and in formal as well as informal group discussions in relation to the development of projects. This relates to the cognitive dimension in Bourdieu's concept of scientific capital, and interesting enough, researchers in both firms showed a high level of agreement on another dimension, having research managers who can interact on an informal and direct personal relation in managing research. It comes close to the social part of the scientific capital concept as argued before and introduces field specific tacit knowledge as a basic condition for managing. One research director explained the necessity of personal relations and trust in managing researchers: ‘you have to look people in the eye when you ask how they feel about the project to see if they mean what they say’ and continued, and ‘we cannot go around and wait and evaluate on the more formal results’. The direct interaction and personal relations based on social trust is very important in these organizations and it is

\(^2\) The two companies agreed to the use of their real name.
precisely formulated in a quote from of one research manager: ‘you can never go out and say “just do it” to a researcher because research management is a question of building trust, you have to create a situation where people dare to take risks in research knowing that management accepts that it can go wrong’.

In universities evaluation systems in ranking of persons and research groups has become more and more visible. In this case study from the world of research in private firms the researchers as well as research managers in the two private companies were asked about their own view on the use of quality control and evaluation systems in the research organizations.

In the two firms both researchers and research managers rather surprisingly agreed that the use of such systems in research management could very easily become a serious threat to the necessary risk taking in research. Some young researchers from both firms with recent experience from working in university labs argued, that the implementation of such procedures in their work could result in a kind of duplication of experiments or a ‘me too’ research strategy where publication counts and citations becomes the ultimate goal – not developing new knowledge or new products. The researchers from Haldor Topsoe told more or less the same storyline in order to make clear how important risk taking behaviour is in a firm living on constantly being able to produce new scientific knowledge; the short version of the storyline is “nobody gets fired in this department even if they burn up several million [Danish crowns] on an unsuccessful project. This is the price of learning by doing in research.”

Asked whether they would put high value on a researcher with publication of articles/patents record or rather would chose one being known to have a good record in making projects, the majority voted for the one with a track record in projects and placed publications/patens on the less prioritised level.

One observed difference between the two firms is the strength of the corporate culture in the research department. Haldor Topsoe has a very stable and rather immobile group of researchers and a special company culture regarding what counts as research quality. This was very clearly supported by a number of supplement statements and comments, for instance in the words of one young researcher: “Relevance or utility for society in general is and has

---

3 In the two companies quality control systems are used in production lines, so it was not a question of unfamiliarity with TQM-systems or the ISO-certification and other control systems.
always been the goal for the company in the eyes of the founder, Haldor. The chemistry we make, environmental protection, better use of resources, better food etc. is without question good for society.” The high priority given to social utility from the view of society in general has its roots in an established company research culture, in the institutional scientific capital and seems to be deeply rooted in the research organization.

In the private research firm the rule of the game or the ultimate criteria for the success of the company is the production of new knowledge to be transformed to products for the market. Today this is very often a very competitive and changing market place and success here is the overall goal and direction for the research. Following this general idea, control and organization of the research work based on Taylorism or scientific management principles should long ago have found their way into these organizations. Most universities and public research organizations have introduced new public management accountability systems based on publication and citation counts and other productivity and control systems. According to the research manager from Haldor Topsoe ‘to us publication is the result of good work, not an end in itself” and this policy seems to work very well with the company’s steady high ranking in international scientific publications.

The two private research organizations more or less followed the line of understanding of how to manage the cognitive and social dimension of scientific capital as demonstrated in the theories on knowledge organizations (Nonaka & Konno 1998, Brown & Duguid 1991). It is the type of management that is based on a high level of self and group organization and governance and is best described as third order research management (Ernø-Kjølhede et. al. 2000), eg., the management of self-management by managing the setting or framework for and general direction of research, not by management in the tradition of Tayloristic production control.

The results presented above are open for different interpretations. Maybe the most obvious interpretation is that the research organization as an organization with its complex social and scientific capital has gained a new role in relation to evaluation of quality in research. Truth claims are not solely or primary neither decided by organizations nor is the competence of the researcher only a question of making projects work, but beside the traditional disciplinary evaluation and training, the diversity in the organization seems to have a growing importance
in the complex knowledge creation. A long tradition for ignoring the organization in the sociology of science has been broken due to the input from the new organizational theory.

**Conclusion:**
The paper started out by looking at how the oldest and most esteemed knowledge organization, the university, and raised some questions about the consequences of the overwhelming use of formalized evaluations in the public research sector as part of new public management. The argument put forward was that governance promoted by the many new evaluation systems, often very formalized and based on quantitative data, have had a no doubt unintended but nonetheless very real influence on the behaviour of researchers and scientists. The influence could be described like that of a Foucaultian panopticon – a centralized and controlling governance mechanism that interferes with research in dangerous ways by reducing the room for risk taking and daring in the process of producing new knowledge.

The bulk of literature on scientific knowledge production has been reluctant to approach the social and organizational dimensions or demonstrated the limits in the Mertonian understanding the cognitive knowledge production (Latour & Woolgar, Knorr Cetina 1999). However, as shown by Mayntz and Schimank (1998), these studies did not contribute much to a more general social theory on scientific knowledge production. A few studies (Bozeman et.al 2001) have introduced human and social capital and thereby integrated the organizational dimensions in research evaluation. The paper argues for the theoretical fruitfulness of 3-dimensional development of the concept of scientific capital by Bourdieu.

The case from Danish research based firms gave a different picture than the one dominated by formalized evaluation systems from universities. The case concluded that formalized evaluation procedures were not on the agenda in private research organizations, which instead pursued active research management strategies in recognition of the need for a high level of trust in the organization if one wants to foster local research cultures and informal management based on subjective knowledge formations.

In the world of Mertonian norms (Fuller 2000) the authoritarian structure of science operates without considering the central problem of mutual social trust. As has been shown earlier, this kind of abstraction from the social and organizational world in which science and scientists
exist is not possible. Hardwig (1991) has formulated the importance of trust in science this way:

“Science, then, is not completely different from other cooperative enterprises; the reliability of scientific testimony, like the reliability of most other testimony, ultimately depends on the reliability of the testifier. [...] An untrusting, suspicious attitude would impede the growth of knowledge, perhaps without even substantially reducing the risk of unreliable testimony. Trust in one’s epistemic colleagues is not, then, a necessary evil. It is a positive value for any community of finite minds, provided only that this trust is not too often abused.” (Hardwig, s.707)

Public research organizations, universities and private knowledge organizations alike need to develop new approaches to management, approaches where managing is a much more social and integrated activity in the organization and is combined with a ‘bottom-up’ or empowerment concept of social or organizational trust in the people working in the organization. And to avoid the classic situation of free riders in academia, managing and evaluating research has to be combined in new learning-based approaches to evaluation of research. Traditional forms of quality control in the scientific community (the peer review system) are still important; but it is not enough. It does not address the changes in the organizational structure of knowledge work or societal demands for responsibility and accountability.
References:


