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Organizational use of evaluations – governance and control in research evaluation

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Abstract:

Organizations perform evaluations in order to demonstrate their trustworthiness to the outside world and to produce knowledge for use by the management of the organization. In the planning and application of specific evaluations in the organization, different participants or stakeholders very often disclose different, hidden or conflicting agendas. In recent years, the use of evaluations in organizations has grown rapidly and we have witnessed the rise of a new bureaucratic instrument in the realm of knowledge production in organizations, *viz.*, internal evaluations. Such evaluations produce a set of data as part of the evaluation process and the long-term impact of this new systematically organised set of data on organizational activities are normally not taken seriously into consideration when the use of evaluations in organizations are discussed. Said differently, evaluations have become a major factor in the management of organizations, but the academic literature on internal evaluation very rarely discusses the impact of this instrument on the long term behaviour and activity of members of the organization. This lacuna in the literature persists despite the well known fact, established by numerous studies of organizational sociology, that people tend to adapt to external behavioural demands especially when related to power relations in the organization.

keywords: research evaluation, governance, social control, publication counts.

Organizational use of evaluations – governance and control in research evaluation

Introduction:

In the age of the audit society (Power 1997), organizational evaluations are often integrated into information management systems (based on data from surveys, statistics and indicators) carrying special authority and facilitating control based on quantified information (Porter 1995) and fostering what can be called an audit culture (Strathern 2000). The quantified information that is produced by an evaluation can easily be used to effect organizational change without paying due respect to the broader role and function of this information. The original context in which it was produced is disregarded, the limits to its validity are ignored, and the control dimension of organisational evaluations is thereby intensified.

The paper will discuss the impact of the growing administrative use of evaluations on organizational behaviour. This use is often seen in the form of internal evaluations. The paper focuses especially on the use of evaluations in public research organisations for two reasons. First, the field of science and research has a more than 200 year long history of using qualitative evaluations to organize quality control and is therefore an exemplary case of evaluation in general. The peer review system is well established in the field and the general concept of evaluation in relation to the development of quality is not new. Second, we have recently observed a considerable growth in the use of a number of different types of organisational evaluations, indicators, self evaluations, internal evaluations, etc. in the science and research of most western countries (Frederiksen, Hansson and Wenneberg 2003, 162, Arnold and Balazs 1998, 33-34). The paper will try to develop a framework for a critical understanding of the complexity of behavioural changes by researchers in public research organizations due to the growing use of systematic evaluations. If the organizational use of evaluation introduces new elements of discipline in the organisation, thereby forcing the individual researcher to act strategically and to perform the necessary adaptive behaviour in order to score high marks on the evaluated indicators, then our basic understanding of the core of knowledge production in public research organizations as well as the interpretation of the evaluation needs to be reconsidered.

Writing about the general trend in the governance[i] of science, Steve Fuller describes the changes in the behaviour of the classical picture of the university researcher with precise irony. "[S]cientists today," he says, "spend an increasing amount of time on entrepreneurial, managerial and accounting tasks at the 'expense' of research in the traditional sense.." and he continues:

> Any organizational sociologist would conclude from this that the character of scientific work has changed to the point that the scientist's primary function is now a sophisticated form of publicity-seeking and record-keeping that enables others, both scientists and non-scientists, to legitimate or delegitimate certain courses of action. (Fuller 2000, 43)

The changed behaviour of scientists described by Fuller is related to major changes in the original logic of the research evaluation system. If actors in the evaluation are able to change behaviour strategically in order to obtain a better evaluation rating, then the original validity of evaluation results has to be questioned, and the understanding and application of evaluation results has to be understood as a much more complex and integrated process within the organisation.

For instance, when the classic research evaluation of articles or research proposals by peers is closely integrated in the public research organisation not only as a form of quality assessment but as an indicator of organisational behaviour (productivity), what will then become of the once clear and very important boundary line between the researcher and the evaluator? The distance and anonymity between the evaluator and the evaluated has been an essential feature of the peer review system and has been crucial to the trust that is habitually placed in the evaluation of new knowledge claims (Merton 1973). The aim of this paper will be to discuss the behavioural impact of public research evaluation. It will especially address the implicit and hidden disciplinary and control dimensions that are intensified when the distance and anonymity among the peers involved in the process disappears.

1. Changes in the uses of scientific knowledge in late modernity

Recent changes in the science-society relation have been characterised in terms of increased dependency on technological knowledge combined with a proliferation of unintended consequences and a growing unawareness of these consequences (Beck 1999), which undermines trust in expert knowledge (Giddens & Beck 1994, Wynne 1996). These changes are in many ways defining characteristic of what is called late modernity or the risk society. In relation to knowledge production in science and research a number of structural changes have been discussed under labels such as Mode 1 and mode 2 science (Gibbons et. al 1994) and the new tendency for science to be transdisciplinary, collectively organized and geared for the production of socially robust knowledge (Nowotny et.al 2001). Several critical voices have pointed to the lack of empirical support for this argumentation (Audetat 2001, Fuller 2000, 2001, Weingart 2000, Godin 1998) and emphasised exaggerations and over-interpretations of various observations. Nevertheless, there seems to be broad agreement on the fact that the recent major changes in modern science and knowledge production is owed in large part to the growing influence of market forces on science and associated organizational changes in the traditional public research organization: the university (Martin 2003). Also, as shown by Beck and Bonss (1984), the production and application of scientific knowledge has moved outside the traditional scientific institutions at a rate that is growing rapidly and the once clear and visible distinction between producing, testing and using new scientific knowledge is becoming more and more complex and blurred in the world of knowledge and risk societies (Stehr 1994, Beck 1999).

Most governments have recently gone through a period of reforms labelled New Public Management. Central concepts in the NPM policy are 'value for money', accountability and efficiency, internal control systems and internal evaluations. The New Public Management movement has introduced new demands for accountability and control and has created a growing space for the organisational use and implementation of evaluations in management.

The introduction of evaluation systems in the organization can take a number of different routes, but we very often find internal evaluation units producing all types of self-evaluations and basic information to be used by external evaluators in order to have the organization certified in a variety of quality assessment systems. In the field of research evaluation, the process has led to the rapid introduction of a number of quantitative evaluation techniques, science statistics, research mapping, bibliometric indicators and citation studies, to supplement or replace the classic peer review evaluation.

1.1 Toward the evaluation society

The evaluation literature has traditionally based discussions about the use of evaluations on Weiss (1979, 1980) and later Chelimsky (1997). Three major models of application have been discussed: the social engineering model, aiming at direct intervention; the enlightenment model, stressing the importance of presenting knowledge to the public; and the interactive model, which stresses the interaction between applied research and policymakers and focuses on advocacy, policy, and decision. Most of the discussions about how to classify different types of evaluations along these lines have been based on a classic linear understanding of evaluation as a knowledge producing process conducted by external professional evaluators delivering results to an audience (policy makers). The combination of changing roles for scientific knowledge in late modernity and changes in the management of the public sector resulted in tendencies and perspectives in evaluations that suggest a number of new and different roles for evaluations. These imply changes in the function of evaluations in the organization: producing organisational learning, producing ritual behaviour, comparing organizations by benchmarking/best practice or by cost benefit/cost efficiency (Sonnichsen 2000, Leeuw et.al. 1994). The growing integration of evaluations in the processes of organisation and management is a forceful demonstration of how evaluation is now becoming an integrated part of the organisational environment as part of the new public management system. This integration draws attention to the boundary lines between methods of evaluation and other control systems like accountancy (intellectual capital statements), quality control systems (TQM) and assessment systems. One consequence is the observable development of different systems by which to authorize evaluations (e.g., the recent demands on rigorous 'evidence based' scientific methods in evaluation from the

US Department of Education or the upcoming efforts of the Campbell Institute to distinguish between 'good' and 'bad' evaluations[ii]).

Evaluation has 'grown up' to be a modern and ubiquitous form of authoritative knowledge production in organizations. As it comes of age we see also the more or less hidden dimensions of its authorization: the decision making that lies behind the evaluation and includes the close relation of knowledge production in organisations to questions of power and discipline that was demonstrated by Foucault.

1.2 The role of quantified information in organisational evaluations

On the basis of a number of very different historical cases, Porter (1995) convincingly demonstrated that the overwhelming political power of quantified knowledge production in organisations and political systems is not necessarily owed to an inherent or special validity in the truth claims of this kind of knowledge but to its political trust-producing power.

> The massive effort to introduce quantitative criteria for public decisions in the 1960s and 1970s was not simply an unmediated response to a new political climate. It reflected also the overwhelming success of quantification in the social, behavioural and medical sciences during the post-war period. ...The push for rigor in the disciplines derived in part from the same distrust of unarticulated expert knowledge and the same suspicion of arbitrariness and discretion that shaped political culture so profoundly in the same period.(Porter 1995, 198-99)

The critical comments on the growing power of quantification in public organizations have been taken up by Power (1997) using the concept of the audit society and Strathern (2000) with the concept of audit cultures. How the use of evaluations and especially of internal evaluation methods was integrated into other quantitative management information systems in public sector organizations was the aim of a large study of the goal oriented performance management system known as 'contract management' in public organizations in Denmark. The study concluded that "counting (is) not just a matter of putting numbers on some organizational phenomena. It really means that the

number has been defined as the major or central characteristic of the phenomena".
(Mouritsen 1997, 152) The production of key figures by the use of different techniques
of quantification is central to the full development of internal evaluation systems. The
systematic counting of all activities implies a fundamental change in the way an
institution or organization works.

Counting or quantification facilitates interventions across distances and establishes a
setting for the comparison of very different organizations or activities by benchmarking
each against the other (Mouritsen 1997, 24). It seems to be a rather well established
policy in the managerialism of NPM to collect huge amounts of quantitative information,
very often in the form of statistics, and feed this quantitative information into different
kinds of models in order to produce critical numbers to be used to compare and evaluate
different activities and to benchmark these without taking into serious consideration the
amount of local variation and uniqueness of these activities. One could at least follow the
advice of Bradley and Schaffer, who suggest that

> modellers should carefully determine what is important enough to measure
> before trying to measure it. They should then try to decide which
> measurement scale is reasonable for the characteristic in question,
> especially avoiding the temptation to treat attributes as if they behave like
> numbers if no justification has been given. (Bradley and Schaffer 1998,
> 192)

This kind of performance management by benchmarking does discipline the employees
in the organization. But management, too, changes its attitude and adopts a style that
resembles production management (Mouritsen 1997). The quest for quantification and
measurement is very real in the evaluative framework of new public management (Pollit
1996).

2. Research evaluation as governance

New standards for evaluations that are clearly oriented toward performance management
have already been introduced in the field of research evaluation. 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 governance based on the recognition of quality. The effects of the peer review process on the researcher used to be the individual researcher's own problem, as was the decision to choose where or when to have your work reviewed. But the peer review system is slowly being integrated and combined with other quantitative types of research evaluation that target performance measurement and accountability and are already operating. 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 raises the question of their influence on the behaviour of the researcher and the whole research organization and how these new evaluation methods work in relation to the legend of the peer review. 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 professional norms and values in the organization. The attempts to de-couple the audit process into separate units or sub-parts of the universities has rarely been successful according to Power. The "external audit process [is] rarely sealed off from the rest of the audit organization, despite strategies with that intention" (Power 1997). The main objective of highly formalized audits or evaluations of research is, 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.

2.1 From classic quality control by the scientific community to new evaluation and auditing systems.

In his famous lecture "Science as a Vocation", Max Weber (1919) put forward his anticipation of coming of a new organisation of universities, based on state-capitalist,

bureaucratic principles 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 1919)[iii] 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. These are sought from government and industry through research relations which commit the university to contribute to national and corporate goals (such as defence, economic competitiveness, and the like). This dependence is conveyed through several mechanisms to faculty and students, and it shapes their work and careers. The most prominent mechanisms of transmission are reflected in changes in the social organization of academic science marked by new structure (administrative offices and centers), new roles (the academic marginal, the entrepreneur, the professor-employer), and new processes (changing relations within research teams and altered standards of scientific practice). 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. Values most strongly affected have to do with criteria for choosing research problems, appropriate working relationships with students, and standards for determining when a piece of scientific research is complete and publishable. These value conflicts create ambivalence, alienation, and anomie which in turn may lead to social disorganization (including deviant behaviors, such as scientific misconduct) and social change." (Hackett 1990, 249-250)

What Hackett describes is the consequence of deeper structural changes in the societal use of knowledge that tends toward new modes of knowledge production and indicates changes in the university as an organisation influencing researchers' behaviour and values (entrepreneurial universities, Clark 1998, cooperation with industry, Etzkowitz 2002). The changes in the public (university) research system have some visible and some not so visible consequences for the field of research evaluation. 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 almost 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 leads either an independent existence or is combined with other systems in the evaluation of research. But this diversity is present not only in methodology or procedure: both the object and the goal of evaluation also vary extensively. The object of evaluation can be anything from the scientist to the institution to the nation state and the goals vary between organizational learning and accountability and control. 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, Arnold and Balasz 1998).

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. This can also be understood as the perspective of planned organizational change and development, or learning by example. 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 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.

While 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, but in the words of Steven Jay Gould

> science has shown a regrettable tendency to both claim superiority (or at least a privileged status) as a "better" way of knowing in general, and also to engage in forays and poaching into mansions that, by elementary courtesy, require an explicit invitation for entrance to someone else's guest. Scientists have tended to depict their own history as a steady march to truth mediated by successful application of a universal and unchanging "scientific method" …Serious historians dismiss this cardboard version of history as linearly accumulating progress. (Gould 2003, 114)

2.2 Changes in research evaluation.

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. What Merton called the CUDOS norms then describe the behaviour in the scientific community (Merton 1973). 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.

The point is that the pros and cons of 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.

Critique of the basic 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, did not contribute to a new explanatory theory of the role of the evaluation system in science and society (Mayntz and Schminak 1998). The system distributes scientific prestige, and accordingly power, 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). 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. From the organizational perspective, Mertonian norms are only a part of the social system that produces and reproduces scientific knowledge. Following Bourdieu (1998, 2004), we can say that the scientific capital controlled by a scientist is produced by a combination of the power of reputation and the control of economic funds. The role of the organization in science and its highly differentiated operation in different scientific fields has been demonstrated Whitley (2001). 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? What are the quality dimensions in research and how can we measure or evaluate the quality of research if not by traditional peer reviews?

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).

Starting from very different discourses -- Bozeman et al. (2001) on research evaluation, Bourdieu (1998, 2004) on science in society and Whitley (2001) on organizational differences between disciplines -- these commentators agree on the necessity of understanding science and research as integrated in social and organizational contexts that include the process of evaluating research quality. Understanding science and research activities in the context of the whole research organisation we are forced to make the question of governance in research evaluation very visible also in relation to the evaluation. The introduction of an understanding of research evaluation that is broader, more systematic and more reflexive 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 research organizations 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 (SCI, impact factors, and citation counts), 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.

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 measurement of research performance in terms of the numbers of patents generated also enables individual researchers to be treated as knowledge-objects, offering a new possibility for individuals to be assessed, managed and supervised. (Sherman 1996)

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 formalized evaluation 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. It is not to be understood as a more or less hidden argument for turning the clock back and restoring the traditional disciplinary sovereignty of science with its feudal hierarchies, letting scientists decide all questions regarding the quality and strategy of the research organization on their own. The rest of the paper will present empirical arguments for another strategy research evaluation – combining research management with the evaluation system and the organization (Sapienza 2004) and the learning and process based tradition in internal evaluation (Sonnichsen 2000, Leeuw et. al. 1994).

3. **Two arguments for a learning based approach in research evaluations**:

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 internal 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 complex relations to other organizations through networks.

Two lines of argument can be produced to criticize the un-reflexive use of quantified evaluation systems in the new public management approach to research evaluation. One is based on reflections upon knowledge producing organisations, mostly private. Modern organisational theory discusses knowledge production or creation from the point of view of how to be most successful in market competition. The traditional preference in organisational theory for scientific management, Taylorism and Fordism as general managerial tools have given way to concepts like complexity, networking across boundaries and knowledge sharing.

The second line of argument follows from case studies of research management practice and evaluations used by two private Danish companies both of which have their own research departments.

3.1 The argument from organisational theory against formalized evaluation of knowledge production:

Recent organizational theory has focused much more directly on institutional or organizational changes than on traditional science policy and has introduced a number of new concepts that describe ongoing turbulent changes in the (private) knowledge organization. In order to understand social and organizational dimensions in relation to development of new knowledge in the firm, Nahapiel and Ghoshal (1998) applye the

concept of social capital as a means to focus on the function of relations and especially network relations in the production of knowledge. Social capital is central for the understanding of the production of knowledge (intellectual capital) and market advantages of the firm. It is

> the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network (ibid. 243).

Other central concepts are 'communities of practice' (Brown and Duguid 1991, Wenger 2000), 'sticky and leaky knowledge' (Brown and Duguid 2001), 'structural holes' (Burt 2002), 'social capital' (Nahapiel and Ghoshal (1998). They are all attempts to capture dimensions of the new important and complex role of knowledge creation in organizations.

In order to understand, manage and evaluate knowledge creation in dynamic and complex organizations, a focus on knowledge in the form of a product, patent or journal article is important but clearly not sufficient. A number of contributions from organizational theory have taken up the challenge. Nahapiel and Ghoshal's definition of social capital, the role of tacit and explicit knowledge in the knowledge creation process (Nonaka 1994, Nonaka and Takeuchi 1995), network relations inside and outside the organization (Kogut 2000), absorptive capacities for new knowledge (Cohen and Levinthal 1990), boundaries and gate-keepers, organizational principles for project work (Grant 1996) - all argue for a much broader understanding of the dynamic role of the organization in the production of knowledge. This focus on the organizational and social processes surrounding knowledge creation has, of course, much to do with the market driven necessity to obtain competitive advantage for the firm, but it discloses the close connection between the organization and knowledge creation. Market competition calls for secrecy in order to protect profitability and therefore introduces serious restrictions for the public peer review process.

These quite different concepts and approaches have one thing in common; they all question the relevance of established ideas of linear implementation of control systems,

management and use of knowledge in the organization without regarding the necessary element of unpredictable learning processes. Implementation of new knowledge was traditionally understood in terms of technical problems and solutions and not as one of continuous learning and creation. It was seen as a rather isolated set of processes taking place within clear-cut and closed boundaries of an organization. The following quote from Nonaka (1994) describes the challenges modern knowledge organizations have to live up to in the knowledge economy.

> At a fundamental level, knowledge is created by individuals. An organization cannot create knowledge without individuals. The organization supports creative individuals or provides a context for such individuals to create knowledge. Organizational knowledge creation, therefore, should be understood in terms of a process that "organizationally" amplifies the knowledge created by individuals, and crystallizes it as a pert of the knowledge network of the organization. …The prime movers in the process of organizational knowledge are the individual members of an organization. Individuals are continuously committed to recreating the world in accordance with their own perspectives. As Polanyi noted, "commitment" underlies human knowledge creation activities. Thus commitment is one of the most important components for promoting the formation of new knowledge within an organization. (Nonaka 1994, 17)

The forefront of organisational theory has studied a large number of predominantly private knowledge producing companies and has developed a theoretical and conceptual framework for understanding high quality knowledge production from a very different point of view than the new public management evaluation approach – the dominating picture in public research organizations.

3.2 The argument from cases in private research organizations:

A case study of two private research organizations with a long tradition for investment in research and a dominant position in their respective field constitutes the background for the other argument. The aim of the case study was to investigate the effect of 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[iv]. The two companies agreed to be presented by their real name. NKT is an old Danish 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 fibers 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. The department is characterized by a remarkable stability in personel.

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 company? One of the most interesting results from the study was the repeated statement from researchers and research managers in both of these private organizations about the importance of solid scientific background of the research manager in the field or in related science fields in order to be able to participate effectively in the person to person interaction and in formal and informal group discussions. Researchers in both companies showed a high level of agreement on the importance of the informal and direct personal relations in managing research, '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' explained one research director and continued, '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. In the words 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'. Related to the emphasis on direct personal relationships in managing research was the very clear message from the interviewed researchers as well as research managers in the two private companies about the use of quality control systems in the research organizations. All interviewed researchers and research managers were asked about their own experience and general view of the use of formal quality control systems (total quality management systems, performance management systems) in research. Both researchers and research managers agreed that the use of such systems

in research management was a serious threat to the necessary risk taking in research and if implemented it could result in a kind of duplication of labour or 'me too' research strategy. The interviewed persons from Haldor Topsoe all told the same story to support the idea of the necessary risk taking behaviour in science and to argue against the use of formalized control systems: "nobody gets fired in this department even if they burn up several million [Danish crowns] on an unsuccessful project." And in the two private 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. In the private research organization the rule of the game or the ultimate criteria for the success of the company is the production of knowledge 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 that are based on publication and citation counts and other productivity and control systems. The research manager from Haldor Topsoe stated directly in a communication, that 'for 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.

What was found in the two private research organizations followed the general line of understanding of how to manage cognitive labour found in organizational theory. 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.

4. Conclusion:

 This paper has tried to raise 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.

Much of the public discourse behind the political decision-making involved in the implementation of evaluation systems in large scale in public research organisations have based their core arguments on (undocumented) experiences from research management in the private research sector. The irony of using this argument is demonstrated by two empirical counter-cases from the private research sector, one from the analysis of conditions for knowledge production in organizational theory, where the role of an open and not hierarchical organization is very much in focus with concepts like social capital, networking and communities of practice, and one from a case study of two Danish research-based companies. The case studies concluded that TQM or 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)

Trust combined with an active, knowledgeable management style seems to be one way to avoid the construction of situations where trust is equated with the quantification of measures and indicators of an NPM concept of research evaluation or assessment as it has been seen in the UK with the RAE (Research Assessment Exercise) (Trow 1996). 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) is 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.

NOTES:

[i] **Governance** is a somewhat ambiguous term for social regulatory processes that directly or indirectly implicate the political system; it is analogous to the sociologists' term "social control." Its political sweep is captured in Harlan Cleveland's well-known admonition that what we need is "more governance and less government." Samuel Krislov on "Governance" in *The Oxford Companion to American Law*. Kermit L. Hall, ed. Oxford University Press 2002. Business School in Copenhagen. 27 October 2004 http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t122.e0382

[ii] U. S. Department of Education Requests Proposals for 'What Works Clearinghouse' http://www.ed.gov/news/pressreleases/2002/03/03252002a.html
The Campbell Collaboration, http://www.campbellcollaboration.org/

[iii] "However this may be, the scientific worker has to take into his bargain the risk that enters into all scientific work: Does an 'idea' occur or does it not? He may be an excellent worker and yet never have had any valuable idea of his own. It is a grave error to believe that this is so only in science, and that things for instance in a business office are different from a laboratory. A merchant or a big industrialist without 'business imagination,' that is, without ideas or ideal intuitions, will for all his life remain a person who would better have remained a clerk or a technical official." Weber, Wissenschaft als Beruf, 1919. Weber 1992

[iv] 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 interviews were conducted by the author in the form of an open dialogue following a number of prepared questions 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 was published in Hansson 2003 (in Danish).

Literature:

Arnold, E. & Balázs, K. (1998). *Methods in The Evaluation of Public Funded Basic Research. A review for OECD*. Brighton: Technopolis Ltd.

Audétat, M. (2001). Re-thinking Science, Re-thinking Society. *Social Studies of Science, 31,* 950-956.

Beck, U., Lash, S., & Giddens, A. (1994). *Reflexive modernization. Politics, tradition and aesthetics in the modern social order.* Cambridge: Polity Press.

Beck, U. & Bonss, W. (1984). Soziologie und Moderniserung. Zur Ortsbestimmung der Verwendungsforschung. *Soziale Welt,* 381-406.

Beck, U. (1999). *World Risk Society*. Cambridge: Polity Press.

Bourdieu, P. (1998). *Vom Gebrauch der Wissenschaft. Für eine klinische Soziologie des wissenschaftlichen Feldes*. Konstanz: UVK Universitätsverlag.

Bourdieu, P. (2004). *Science of Science and Reflexivity*. Oxford: Polity

Bozeman, B., Dietz, J. S., & Gaughan, M. (2001). Scientific and technical human capital: an alternative model for research evaluation. *International Jorunal of Technology Management, 22,* 716-740.

Bradley, W. J. & Schaefer, K. C. (1998). *The Uses and Misuses of Data and Models. The Mathematization of the Human Sciences*. Thousand Oaks, Calif.: SAGE.

Brown, J. S. & Duguid, P. (1991). Organizational Learning and Communities-of-Practice: Toward a Unified View of Working, Learning, and Innovation. *Organization Science Special Issue: Organizational Learning: Papers in Honor of (and by) James G.March, 2,* 40-57.

Brown, J. S. & Duguid, P. (2001). Knowledge and Organization: A Social-Practice Perspective. *Organization Science: A Journal of the Institute of Management Sciences, 12,* 198-213.

Brunsson, N. & Jacobsson, B. (2000). *A World of Standards*. Oxford: Oxford University Press.

Burt, R. S. (2002). The Social Capital of Structural Holes. In M.F.Guillén, R. Collins, P. England, & M. Meyer (Eds.), *The new Economic Sociology* (pp. 149-190). New York: Russell Sage Foundation.

Chelimsky, Eleanor , The Coming Transformation of Evaluatrion, in Chelimsky, E. and Shadish, W. R. (1997). *Evaluation for the 21st century. A handbook*. Thousand Oaks: Sage.

Clark, B. R. (1998). *Creating Entrepreneurial Universities - Organizational Parthways of Transformation*. Oxford: Pergamon.

Cohen, W. M. & Levinthal, D. A. (1990). Absorptive Capability. *Aministrative Science Quarterly, 35,* 128-152.

Ernø-Kjølhede, E. (2001). *Managing Collaborative Research. Unveiling the Microdynamics of the European Triple Helix*. København: Handelshøjskolens Forlag.

Etzkowitz, H. (2002). *MIT and the rise of entrepreneurial science*. London: Taylor & Francis Books Ltd.

Frederiksen, L. F., Hansson, F., & Wenneberg, S. B. (2003). The Agora and the Role of Research Evaluation, *Evaluation*, vol. 9, (2), 149-172.

Fuchs, S. & Turner, J. H. (1986). "What Makes a Science 'Mature'?: Patterns of Organizational Control in Scientific Production". *Sociological Theory, 4,* 143-150.

Fuller, S. (2000). *The governance of science: ideology and the future of the open society*. Buckingham: Open University Press.

Fuller, S. (2001). *Knowledge Management Foundations*. Boston: Butterworth-Heinemann.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S. S. P., & Trow, M. (1994). *The new Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies.* London: Sage Pubications.

Godin, B. (1998). The new production of knowledge: The dynamics of science and research in contemporary societies. *Social Studies of Science, 28,* 465-483.

Gould, S. J. (2003). *The hedgehog, the fox, and the magister's pox.Mending the gap between science and the humanities*. London: Jonathan Cape.

Grant, R. M. (1996). Toward a Knowledge-based Theory of the Firm. *Strategic Management Journal, 17,* 109-122.

Hackett, E. J. (1990). Science as a Vocation in the 1990s: The Changing Organizational Culture of Academic Science. *The Journal of Higher Education, 61,* 241-279.

Hansson, F. (2002). How to evaluate and select new scientific knowledge?.Taking the social dimension seriously in the evaluation of research quality. *Vest, 15,* 27-52.

Hansson, F. (2003). *Forskningsevaluering, kvalitet og organisation. Nye roller for forskningsevalueringen i organisationer*. København: Samfundslitteratur.

Hardwig, J. (1991). The Role of Trust in Knowledge. *Journal of Philosophy, 88,* 693-700.

Knorr-Cetina, K. D. (1981). *Manufacture of Knowledge. An Essay on the Constructivist and Contextual nature of Science*. Oxford: Oxford University Press.

Knorr-Cetina, K. D. (1999). *Epistemic cultures. How the sciences make knowledge*. Cambridge¸ Mass.: Harvard University Press.

Kogut, B. & Zander, U. (1992). Knowledge of the Firm, Combinative Capabilities, and the Reprlication of Technology. *Organization Science, 3,* 383-397.

Kogut, B. (2000). The Network as Knowledge: Generative Rules adn the Emergence of Structure. *Strategic Management Journal, 21,* 405-425.

Kostoff, R. N. (1999). Science and technology innovation. *Technovation, 19,* 593-605.

Krislov, Samuel "Governance" *The Oxford Companion to American Law*. Kermit L. Hall, ed. Oxford University Press 2002. *Oxford Reference Online*. Oxford University Press Business School in Copenhagen. 23 August 2004 <http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t122.e0382

Latour, B. & Woolgar, S. (1986). *Laboratory Life. The Construction of Scientific Facts*. Princeton: Princeton University Press.

Leeuw, F. L., R. C. Rist, & R. C. Sonnichsen (Eds.), *Can Government Learn? Comparative Perspectives on Evaluation & Organizational Learning. Can governments learn?* (pp. 125-144). New Brunswich: Transaction Press

Martin, B. R. (2003). The changing social contract for science and the evolution of the university. In A.Geuna, A. J. Salter, & W. E. Steinmueller (Eds.), *Science and Innovation: Rethinkinbg the rationales for funding and governance* (Cheltenham: Edward Elgar Publishing Ltd.

Mayntz, R. & Schimank, U. (1998). Linking Theory and Practice: Introduction. *Research Policy, 27,* 755.

Merton, R. K. & Zuckerman, H. (1971). Institutionalized Patterns of Evaluation in Science. *Minerva, 9.*

Merton, R. K. (1973). *Sociology of science. Theoretical and empirical investigations*. Chicago, Ill..

Mouritsen, J. (1997). *Tællelighedens regime. Synlighed, ansvarlighed og økonomistyring gennem mål og rammer i statslige institutioner*. København: Jurist- og Økonomiforbundets Forlag.

Nahapiet, J. & Ghoshal, S. (1998). Social capital, Intellectual Capital and the Organizational Advantage. *Academy of Management Review, 23,* 242-266.

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation, *Organization Science*, vol. 5, (1), 14-37.

Nonaka, I. & Konno, N. (1998). The Concept of "Ba". Building a Foundation for Knowledge Creation. *California Management Review, 40,* 40-54.

Nowotny, H., Gibbons, M., & Scott, P. (2001). *Re-thinking science.Knowledge and the Public in an Age of Uncertainty*. Oxford: Polity Press.

Pollitt, C. (1996). Justification by works or by faith?.Evaluating the New Public Management. *Evaluation, 1,* 133-154.

Porter, T. M. (1995). *Trust in Numbers. The pursuit of Objectivity in Science and Public Life*. Princeton: Princeton University Press.

Power, M. (1997). *The Audit Society. Rituals of Verification*. Oxford: Oxford University Press.

Rescher, N. (1995). *Public concerns. Philosophical studies of Social Issues*. Lanham: Rowman & Littlefield.

Rogers, J. D. & Bozeman, B. (2001). "Knowledge Value Alliances".An Alternative to the R&D Project Focus in Evaluation. *Science, Technology & Human Values, 26,* 23-55.

Sapienza, A. M. (2004). *Managing Scientists.Leadership Strategies in Scientific Research*. New York: John Wiley and Sons Ltd.

Sherman, B**.** (1994). Governing science: Patents and public sector research. In M.Power (Ed.), *Accounting and Science. Natural Inquiry and Commercial Reason* (pp. 170-194). Cambridge: Cambridge University Press.

Sonnichsen, R. C. (2000). *High impact internal evaluation. A practitioner's guide to evaluating and consulting inside organizations*. London: Sage Publications Ltd.

Stehr, N. (1994). *Knowledge Society*. London: Sage.

Strathern, Marilyn (2000). *Audit cultures.anthropological studies in accountability, ethics and the academy*. London: Routledge.

Trow, M. (1996). Trust, markets and accountability in higher education: a comparative perspective. *Higher Education Policy, 9,* 309-324.

Weber, M. (1992). *Wissenschaft als Beruf 1917/1919. Politik als Beruf 1919*. Tübingen: Mohr.

Whitley, R. (2000). Science Transformed ? The Changing Nature of Knowledge Production at the End of the Twentieth Century. In *The Intellectual and Social Organization of the Science* (oxford: Oxford Univers

Weingart, P. (2000). From "Finalization" to"Mode 2": old wine in new bottles? *Social Science Information, 36,* 591-613.

Weiss, C. H. (1979). The many meanings of Research utilization. *Public Administration Review,* 426-431.

Weiss, C. H. & Bucuvalas, M. (1980). *Social Science Research and Decision-making*. New York. Weiss, C. H. (1999).

Wenger, E. (1998). *Communities of practice. Learning, meaning, and identity*. Cambridge: Cambridge University Press.

Wynne, B. (1996). May the Sheep safely Graze? A Reflexive View of the Expert-lay Knowledge Divide. In S.Lash, B. Szerszynski, & B. Wynne (Eds.), *Risk, Environment and Modernity. Towards a new Ecology* (pp. 44-83). London: Sage Publications.

Ziman, J. (2000). *Real science.What it is, and what it means*. Cambridge: Cambridge University Press