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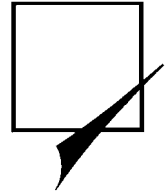
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# **Organizational Use of Evaluations**

## *Governance and Control in Research Evaluation*

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Today's organizations perform evaluations in order to demonstrate their trustworthiness to the outside world and in order to produce information for use by management. In the planning and application of specific evaluations, different participants or stakeholders very often have different 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: the internal evaluation. Such evaluations produce a set of data as part of the evaluation process, and the long-term impact of the use of these data on organizational activities is not normally given serious consideration when the use of evaluations in organizations is discussed. These evaluations have become a major factor in the management of organizations, but the academic literature on evaluation very rarely discusses the impact of this instrument of governance on the behaviour and activity of members of the organization.

**KEYWORDS:** governance; knowledge organizations; performance evaluation; research evaluation; social control in universities

### **Introduction**

In the age of the audit society, evaluations are often integrated into information management systems and are based on quantitative data from surveys, statistics and other indicators carrying special authority and facilitating a special kind of governance or control associated with quantified information (Porter, 1995; Power, 1997). Strathern (2000) captures this development in the concept of an 'audit culture', which is meant to highlight the fundamental changes in organizations that are produced by the dominance of control by quantified information. Accelerated by the systematic use of evaluations, the organization produces a situation where evaluations will have to be considered as a part of the strategy and culture of the organization both by individual members and by the organization itself. Evaluation was originally conceived as an instrument to guide and

reform policies, projects and programmes in the early 1960s (Campbell, 1988; Campbell and Stanley, 1968; Schwandt, 2002; Weiss, 1999) but has increasingly grown to become an instrument that is integrated with the governance systems of organizations. Organizational applications often dominate the classic evaluation approach, where knowledge of reform and learning was central. This has resulted in disregarding the original context of the evaluation knowledge, and thus the limits of the reliability and validity of the knowledge produced by the evaluation, thereby intensifying the control dimension of the use of evaluations in organizations.

This article will discuss the impact of the growing administrative use of evaluations on organizational behaviour from the perspective of governance<sup>1</sup> in science. The aim of the article is to discuss the behavioural impact of research evaluation on researchers in public research organizations like universities. It will especially address the implicit and hidden disciplinary and control dimensions of research evaluation that are intensified when the distance and anonymity among the peers involved in the process of the classic research evaluation disappear.

I focus on the use of evaluations in public research organizations for two reasons. First and foremost, the field of science and research is unique in relation to the question of evaluation because for more than 200 years it has been using qualitative evaluations (peer reviews) to achieve quality control and select the best possible new knowledge. The peer review system is well established in all scientific fields and the general concept of qualitative evaluations in relation to the development of scientific quality is an exemplary case of evaluation in general. Second, we have recently observed a considerable growth in the use of a number of different types of organizational evaluations in relation to science and research; bibliometric indicators, self-evaluations, internal evaluations and research statistics are increasingly employed by national and international funding bodies (Arnold and Balázs, 1998: 33–4; Frederiksen et al., 2003: 162). The article will provide a framework for a critical discussion of the complexity of strategic behavioural changes imposed on researchers and research groups in public research organizations due to the growing use of systematic quantitative evaluations. The scenario can also be understood as an illustration of how evaluations are part of a more general process of transparency in social life or, as Weber (1972) saw it, as part of an ongoing process of disenchantment (*'Entzauberung'*) with modernity, finally becoming ways of disciplining social life.

## **Changes in the Uses of Scientific Knowledge in Late Modernity**

Recent changes in the science–society relation have been characterized in terms of society's increased dependency on technological knowledge combined with a proliferation of unintended consequences and a growing unawareness of these consequences. This is generally taken to undermine trust in expert knowledge (Beck, 1999; Beck et al., 1994; Wynne, 1996). The production and application of scientific knowledge has moved outside the traditional scientific institutions at a rapidly growing rate. The once well-defined boundary between producing, testing

and using new scientific knowledge (Gieryn, 1983) is becoming more and more complex and blurred in societies that are characterized by knowledge and risk (Beck, 1999; Beck and Bonss, 1989; Stehr, 1994, 2002). The literature on policy and organization in science and research has discussed these changes under different labels. The discussion can be grouped roughly into three central positions or discourses: the national innovation systems theory (Lundvall, 1997, 2002), the Triple Helix theory (Etzkowitz and Leydesdorff, 2000) and the theory of Mode 2 knowledge production. The last of these has attracted much attention due to its ambition as a general social theory of epistemic change. Starting from a distinction between Mode 1 and Mode 2 science (Gibbons et al., 1994), which attempted to explain the emerging tendency for science to be transdisciplinary and collectively organized as responses to market demands, it grew into an account of the production of socially robust knowledge (Nowotny et al., 2001). The theory has been criticized as lacking empirical support and as exaggerating the importance of various observations (Audétat, 2001; Fuller, 2000, 2001; Godin, 1998; Weingart, 2000). Despite these criticisms, however, there seems to be broad agreement that recent changes in modern science and knowledge production are owed mainly to the growing influence of market forces on science. But market demands alone do not produce these changes. Most governments have recently gone through a period of reforms under the label New Public Management (NPM). The concepts of 'value for money', accountability and efficiency, internal control based on auditing systems and evaluations are central to NPM. New demands for accountability and control have created a growing marketplace for the use and implementation of evaluations and assessments by management in research organizations and elsewhere. Based on historical cases, Porter (1995) has convincingly demonstrated that the overwhelming political power of quantified knowledge production in organizations and political systems is not so much owed to an inherent or special validity in the truth claims of this kind of knowledge as to the political power to produce relations of trust.

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: 198–9)

This observation is of course just as relevant for knowledge claims in evaluations as in any other field of applied social science. In the 1990s, a major study of 'contract management' in Danish government institutions was initiated in order to understand better how the use of evaluations was integrated into other quantitative management information systems in public sector organizations. 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 principle of 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. These models are then used to produce critical numbers in order to compare and evaluate different activities and to benchmark them – often without taking into serious consideration the amount of local variation and uniqueness of these activities (Pollitt, 2003). Reflections on the content of quantified information should 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, 1996: 192)

Performance management that applies evaluation, contract steering and benchmarking does discipline employees in the organization. Those in management also change attitude, however, and adopt a style that resembles production management (Mouritsen, 1997). The quest for quantification and measurement is very real in the evaluative framework of NPM (Pollitt, 1996). The introduction of evaluation systems in the organization can take a number of different routes. However, very often there are combinations of external evaluations supported by internal evaluation units producing all types of self-evaluation and basic information to be used by external evaluators in order to have the organization certified in a variety of quality assessment systems.

## **Toward the Evaluation Society**

The unique combination of demands, stemming both from the market and the public policy arena, for quantified information to help navigate uncertain terrain in modern society has helped to create a new situation for the uses of evaluations. Evaluation literature has traditionally discussed the use of evaluations from a policy point of view (Chelimsky, 1997; Weiss, 1999). Three major models of application have dominated the discussion: the social engineering model, aiming at direct intervention; the enlightenment model, stressing the importance of presenting knowledge to the public; and the interactive model (Bryant, 1995), which stresses the interaction between applied research and policy-makers and focuses on advocacy, policy and decision. These models have in common a rather traditional model of expert knowledge application. Difficulties in implementing linear and rational causal relations from evaluation studies in everyday social settings opened the way for approaches like action research (Toulmin and

Gustavsen, 1996); and other notions of involving dialogue and stakeholder participation in evaluation have had a renaissance as an alternative to the expert approach (Greene, 1996). Recently, it seems to have been set aside by a new wave of effect-oriented evaluations. Indeed Schwandt has questioned 'the assumption that the continued development of a professional practice of evaluation experts and all the trappings of certification, credentialing, and institution building are unqualified goods. I have no illusions that such practice can be undone' (2002: 5). His point is overwhelmingly demonstrated by slogans related to the use of evaluative knowledge in public policy like 'what works' and 'evidence-based policy', signalling a return to a quantified approach to evaluations and randomized experimentation in evaluations (Sanderson, 2002). Behind the rhetoric of efficiency and political decisiveness, this process also signals a return to the oft-criticized positivistic ideal of objective social knowledge. Shadish et al. (2005) offer an especially polemical version of this argument.

The ideal of the evidence approach in evaluations seems to be to establish a system by which to distinguish between 'good' and 'bad' evaluations in the spirit of Karl Popper's (1995) pragmatic piecemeal social engineering, while keeping the optimism of a brave new world found in classic positivist writings (Lundberg, 1939) at arm's length. But as Sanderson (2002) notes, policy and other social areas are very complex and build on change and learning in a fundamental way, meaning that stable and solid knowledge about social affairs is extremely rare over the long term (Beck and Bonss, 1989). Sanderson concludes his study of the role of evaluations in evidence-based policy by arguing for another approach to evaluation, where

... evaluation [is] conceived somewhat differently than in traditional accounts. A focus on the role of evaluation in policy learning is required to solve the paradox in late modernity: that while increasing complexity of social systems progressively undermines notions of certainty in social knowledge it simultaneously raises the stakes in relation to rational guidance of those systems. (Sanderson, 2002: 19)

The combination of changing roles for scientific knowledge in late modernity and changes in the management of the public sector has 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 evaluation in the organization: producing organizational learning, producing ritual behaviour, comparing organizations by benchmarking/best practice or by cost benefit/cost efficiency (Leeuw et al., 1994; Sonnichsen, 2000). The growing integration of evaluations in the processes of organization and management is a forceful demonstration of how evaluation is now becoming an integrated part of the organizational environment under the new public management system. This integration draws attention to the boundary lines between methods of evaluation and assessment and other control systems like accountancy (intellectual capital statements), quality control systems like total quality management (TQM) and assessment systems.

## **Research Evaluation as Governance**

In the field of research evaluation, the changes outlined have led to the rapid introduction of a selection of quantitative evaluation techniques, science statistics, research mapping, bibliometric indicators and citation studies, to supplement or replace the classic peer review evaluation. The variation in implementing systems of research evaluation between countries is great but the overall trend is very clear: new standards for quantified evaluations that are clearly oriented toward performance management in research have rapidly been introduced in all western countries and international organizations (OECD, 1997, 1999, 2002). In the day-to-day practice of individual researchers, the peer review system is as important as ever as a method to control the quality of research, serving as a form of self-regulating quality control and constituting a vital part of the 'legend of science'. 'Scientists are thus held accountable to their community, rather than to their superiors or for themselves. Peer review keeps the official scientific literature reasonable, honest and factually reliable' (Ziman, 2000: 43). The peer review system produces a special kind of governance based on the recognition of quality or scientific capital (Bourdieu, 2004). Nevertheless, the system is slowly but steadily integrated and combined with quantitative research evaluation systems related to performance measurement and accountability and based on registration of productivity by quantitative indicators like citation indexes and impact factor counts. The introduction of new forms of governance in science accentuates the question of their influence on the behaviour of the researcher and the whole research organization. It also suggests the need for a closer look at how these new evaluation methods work in relation to the legend of the peer review and the Mertonian norms for scientific behaviour.

The implementation of a set of standardized procedures in professional organizations often results in unwanted and destructive consequences in relation to existing professional norms and values (Brunsson and Jacobsson, 2000). Attempts to decouple the audit process into separate units or subparts of the universities have rarely been successful, says Power, who notes that the 'external audit process [is] rarely sealed off from the rest of the audit organization, despite strategies with that intention' (1997). Like other NPM programmes, the main objective of highly formalized audits or evaluations of research is 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' (Power, 1997: 97).

## **From Classic Quality Control by the Scientific Community to New Evaluation and Auditing Management Systems**

Writing about trends in the governance 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.' 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 delegitimize certain courses of action. (Fuller, 2000: 43)

Evaluations are one of the main agents of this change. The changed behaviour of scientists described by Fuller relates to major changes in the new logic of the research evaluation system, the original logic being related to the peer review 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 application of such results has to be understood as a much more complex and integrated process within the organization.

For instance, when the classic research evaluation of articles or research proposals by peers is closely integrated in the public research organization not only as a form of quality assessment but as an indicator of organizational behaviour (productivity), what will then become of the once clear and very important boundary between the researcher and the evaluator? The distance and anonymity between the evaluator and the evaluated have been an essential feature of the peer review system and crucial to the trust that is habitually placed in the evaluation of new knowledge claims (Merton, 1973).

In his famous 1919 lecture 'Science as a Vocation', Weber (1992) anticipated the coming of a new form of university organization based on state-capitalist, bureaucratic principles already visible in research universities in the USA in his time. He used the occasion to herald new and contradictory demands of the university teacher. As emphasized by Hohendahl (2004), Weber did not rely on empirical studies of American universities but used observations to highlight emerging problems for the classic Humboldtian model of university research, based on the idea of autonomy and independence from society. As Weber saw it, scientists could not ignore the new demands on the modern researcher: being a scientist or researcher is a vocation or job that is not so different from other demanding jobs, like being a successful businessman (Weber, 1992).<sup>2</sup> In 1990, Hackett used Weber as the starting point for an empirical analysis of the circumstances of university-based research in the last part of the century. Hackett summarizes the developments as follows:

Universities have become more dependent on external agencies for material and cultural resources such as research funds and legitimacy. . . . 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. . . . 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: 249–50)

Weber used the American universities as an example of his general theory of modernity: an ongoing process of creating transparency in social life by disenchantment ('Entzauberung'), contrasting it with Humboldt's romantic picture of the university-based scientists. Hackett, indeed, correctly describes a number of important consequences of modernity for the university, including administrative changes and a widespread feeling of alienation and ambivalence among university scientists, but he does not indicate the Humboldtian contrast (Hohendahl, 2004). Martin has argued (2003) that the university has existed as a remarkably stable social institution, producing specialized and high-quality knowledge during the last two centuries. Hackett's analysis does not raise the question of whether recent changes on the 'surface' of university life can be read as indicators of basic changes in the organization of university science and in the organization of knowledge production. Do the observed changes in the university affect the social and organizational conditions for the quality control of new knowledge claims, i.e. the peer review system? Large-scale social changes influencing the scientific production of knowledge have been going on, as discussed earlier in the article (Beck, 1999; Beck and Bonss, 1989; Stehr, 1994); and the question of how scientific quality is agreed upon, measured and guaranteed is part of this discussion. This raises a basic question: are we observing the consequence of deeper structural changes in the societal use of knowledge, changes that tend toward new modes of knowledge production and indicate still further changes in the university as an organization influencing the behaviour and values of researchers? Are we really witnessing the birth of the 'entrepreneurial university' (Clark, 1998) as academic cooperation with industry increases (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 today it is 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 lives either an independent existence or is combined with other systems to evaluate 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 (Arnold and Balász, 1998; Frederiksen et al., 2003).

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 from the perspective of planned organizational change and development, or learning by example. The evaluation methods vary from qualitative participative studies through to classic peer review studies and the use of benchmarking and best practice studies. Additionally, the introduction of new actors from outside the scientific community signals the growing social and political role played by science in modern society as well as the democratic demand for influence and control of the once closed and authoritarian science community.

## **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) by the scientific community, i.e. based on the peer review process in the field or discipline (Hansson, 2002, 2003; Merton, 1973). 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. So the CUDOS norms, as Merton referred to them, 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 an attempt to improve the distribution of resources to research, in cost-benefit terms, in order to improve quality (Kostoff, 1995). 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 disciplinary agreement by peers) in terms that are now also operational outside the specific scientific community.

The pros and cons of peer reviewing have been analysed frequently (Cicchetti, 1991) and are more or less known and accepted by the scientific community. The drawbacks are accepted largely because nobody can 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 accumulation of knowledge. (1971: s. 495)

This is a classic picture of the community of science as a rather closed social system that is sequestered from society with its own set of specific and somewhat disenchanting social norms. The CUDOS norms, according to Merton (1973), guarantee the quality of knowledge products through the control of the publication of results in scientific journals and they are crucial to the overall operation of this evaluation system.

Criticism 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 (Knorr-Cetina, 1981, 1999; Latour and Woolgar, 1986). The emphasis on micro-processes in these studies, however, did not contribute much to a new explanatory theory of the role of the evaluation system in science and society (Mayntz and Schimank, 1998). The peer review 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 traditions emphasizes the role of the organization of labour and its relations to the surrounding society. From an organizational perspective, Mertonian norms are only one part of a larger social system that produces and reproduces scientific knowledge. Following Bourdieu (1998, 2004), we can say that the scientific capital controlled by the individual scientist is produced by a combination of the power of reputation and the control of economic and other resources. Whitley (2000) has demonstrated the role of the disciplinary organization in science and its highly differentiated operation in different scientific fields. The consequences of an organizational perspective on research evaluation and, not least, the changes and the appearance of many new evaluation methods related to quality control of knowledge in the modern public research organization have not been systematically analysed. From the perspective of the research organization, a number of central questions related to scientific quality arise:

- What constitutes quality and how is quality evaluated?
- Who decides, and what is the role of the scientific community and its organization into disciplines?
- What is the role of the local research organization and its research management in relation to the question of quality?
- How can we measure or evaluate the quality of research if not by traditional peer reviews?

In the world of the CUDOS norms, power and hierarchy in the peer review system were always more or less separated from the research organization. These questions place the organization, not the individual researcher, at the centre of the evaluation process. Research evaluation has always implicitly or explicitly relied on a power dimension and relates to a hierarchy based on power and knowledge (Bourdieu, 2004). A dramatic change has occurred in the integration of the evaluation function in the research organization. As Bozeman et al. (2001)

point out, research evaluation can no longer function without taking into account the social context or organization of 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 et al., 2001: 724)

The study by Bozeman introduces the necessity of analysing science and research quality as integrated in the social and organizational contexts that include the process of evaluating research quality. Starting from different discourses, Bozeman et al. (2001) on research evaluation, Bourdieu (1998, 2004) on science in society and Whitley (2000) on organizational differences between disciplines, these authors agree on the necessity to understand science and research activities in the context of the whole research organization and to make the question of governance in research very visible 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, which is solely based on reviews of articles, publication lists, etc. implies changes in the concept of governance of science (Fuller, 2000). Construing the evaluation process on the idea of integrating the whole social and organizational context of scientific work – its scientific capital so to speak (Bourdieu, 2004) – evaluation of research comes into its own as one important element in the total process of governing researchers and scientists, but by no means the only one.

The result is the existence of new forms of governance in research evaluation in public research organizations proceeding in the shadow of the implementation of New Public Management evaluation systems. It means on the one hand evaluation by instruments of formal control like productivity measures by quantitative indicators (journal impact factors, 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. On the other hand, no science field today has a stable and dominating paradigm in the frontiers of a discipline or subdiscipline of the kind Kuhn imagined, when he wrote about revolutions in science in the 1940s and 1950s (Fuller, 2000a; Kuhn, 1970). Perhaps the absence of stable points of orientation is one of the motivating forces behind the pressure for more systematized and quantified information; perhaps science simply lacks proper paradigms. As a result, there is a tendency to focus the research organization on controlling the individual researcher with the help of a constant monitoring of productivity, an approach that necessarily involves a certain amount of distrust between the different actors in the organization.

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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 result is a new focus on organizational supervision and scientific productivity, based on a number of indicators that are directed toward each individual researcher, from the young PhD student to the tenured professor in the organization. While it is still a far cry from Foucault's panopticon, the role of evaluation in these settings is much more that of fostering accountability than of learning. Some of the more critical consequences for governance in science and research include:

- tendencies toward risk reduction behaviour by scientists, with a subsequent reduction in the production of new knowledge;
- tendencies to stay inside well-defined or traditional fields with the effect of narrowing horizons to traditional disciplines instead of encouraging trans-disciplinarity;
- tendencies to establish a strong relation between productivity and expenses and foster 'budget thinking' behaviour in organizations and among individual researchers;
- tendencies to 'downgrade' the kinds of specialized knowledge in the research organization like 'craftsmanship', which are not so easily measured.

The 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 arguments in favour of a critical view of the uses of evaluation in public research organizations as a system of learning and development and not only as forms of control. Criticizing some of the consequences of formalized research evaluation is not to be understood as a 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 discussion has so far tried to demonstrate aspects of the problematic and dysfunctional consequences of what may be an overhasty implementation of quantified research evaluation systems in the public research organization 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 towards 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 research management in order to produce the best possible quality of research. The growth and complexity of the research organization in universities and its complex relations to other organizations through networks is a major

force behind the need for management. This argument is not exclusively related to universities or other public research organizations but applies also to modern organizations where knowledge is a central factor. It applies wherever there is a need for knowledge management.

Modern organizational theory has left its traditional preference for scientific management (Taylorism and Fordism) as general managerial tools and in the last twenty years given way to concepts like complexity, networking across boundaries and knowledge sharing. This is of course very much a result of 'pressures from reality', that is, the rise of successful new firms based on knowledge production and new forms of organization, where networking across boundaries and knowledge sharing is a part of the reason for success.

### **The Argument from Organizational Theory against Formalized Evaluation of Knowledge Production**

The response in organizational theory is a much more direct focus on institutional or organizational changes that support the production of new knowledge in the organization.

It has been instrumental in the introduction of 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 the development of new knowledge in the firm, Nahapiet and Ghoshal (1998) apply the concept of social capital as a means to focus on the function of relations (and here especially network relations) in the production of knowledge. Social capital is central to understanding 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. (Nahapiet and Ghoshal, 1998: 243)

Other central concepts from studies of knowledge in organizations are 'communities of practice' (Brown and Duguid, 1991, 1998; Wenger, 1998), 'sticky and leaky knowledge' (Brown and Duguid, 2001), 'structural holes' (Burt, 2002). In the process of producing, accepting and implementing new knowledge in an organization, these concepts all attempt to capture dimensions of the new, important and complex role of knowledge creation in organizations.

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. Nahapiet and Ghoshal's definition of social capital draws its inspiration from Bourdieu to analyse knowledge creation as a social process. Brown and Duguid (1991) elaborate on how informal collaborations disregard formal structures with the concept of communities of practice. How to transform and distribute different types of knowledge, tacit and explicit, in the knowledge creation process is central to the writings by Nonaka (1994; Nonaka and Takeuchi, 1995), and the focus is on

knowledge creation in relation to strategy inside (large) organizations. Others have looked at smaller firms and stressed the importance of knowledge-sharing relations through network relations inside and outside the organization (Kogut, 2000), emphasizing the need to enlarge an organization's absorptive capacities for new knowledge (Cohen and Levinthal, 1990), or for setting up organizational principles for project work with more awareness of boundaries and gate-keepers (Grant, 1996). These authors have in common a renewed focus on the fact, first established by Marx, that it is the living labour of the people in the organization, not the organizing principle, that is the basic foundation for knowledge production in any firm. This all supports an argument for a much broader understanding of the dynamic role of the relation between people and organization, that is, the role of managing the organization of social capital in the production of knowledge. This focus on the organizational and social processes surrounding knowledge creation has much to do with the market-driven necessity for the firm to obtain competitive advantage, of course, but it also discloses the close connection between organization and knowledge creation. Market competition calls for secrecy in order to protect profitability, thus introducing serious restrictions for the public peer review process, but it has also proven itself to be much more dynamic in organizing knowledge production than the dusty university model.

These quite different concepts and approaches have one thing in common. They all question a linear implementation of control systems in the organization that does not take the element of unpredictable learning processes into account. 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 the clear-cut and closed boundaries of an organization. The following quote from Nonaka (1994) describes the challenges that modern knowledge organizations have to face 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 part 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 organizational 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 point of view that differs greatly from the New Public Management evaluation approach – the dominating picture in public research organizations. Results have not been noted in the area of control and monitoring but quite the opposite.

The most remarkable results have been witnessed on social dimensions: in the social or scientific capital of members of knowledge organizations. Active management of knowledge workers or researchers in the organization is a necessary part of the process but this control does not have to be based on the principle of formal control by distance as in New Public Management.

## **Conclusion**

This article has raised some questions about the consequences of the overwhelming use of formalized evaluations in universities and in the public research sector as part of New Public Management. It argues that public research governance promoted by the many new evaluation systems, which are 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 risk is a centralized and controlling governance mechanism interfering with research in dangerous ways by reducing the room for risk taking and daring in the process of producing new knowledge, ending in governance like a Foucaultian panopticon.

The – at least in Demark – very popular policy of managers from private firms being placed on the boards of universities in order to strengthen their professional management seems, in the light of the enormous NPM evaluation and control systems, to have a subtle irony, which is demonstrated by a number of core articles from organizational studies of private knowledge organizations. The discussion of theories on knowledge production in organizational theory encourages open and not hierarchical organizations with a focus on concepts like social capital, networking and communities of practice and not on formalized evaluation procedures. Knowledge-based firms seem to prioritize 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. Hardwig (1991) has formulated the importance of trust in science in 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, 1991: s. 707)

Trust combined with an active, knowledgeable management style seems to be one way to avoid the construction of situations where trust formally equates with the quantification of measures and indicators of an NPM concept of research evaluation or assessment, a point also stressed by Sitkin and Stickel (1996).

Public research organizations, universities and private knowledge organizations alike need to develop new approaches to management, approaches where managing research 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. To avoid the classic situation of free riders in academia, managing and evaluating research have to be combined in new learning-based approaches. Traditional forms of quality control in the scientific community (the peer review system) are still important, but not sufficient. They do not address the problems of changes in the organizational structure of knowledge work or societal demands for responsibility and accountability.

## Notes

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1. 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'. (Krislov, 2002).
2. '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*, tr. in Lassman (1989).

## References

- Arnold, E. and K. Balázs (1998) *Methods in the Evaluation of Public Funded Basic Research: A Review for OECD*. Brighton: Technopolis.
- Audétat, M. (2001) 'Re-thinking Science, Re-thinking Society', *Social Studies of Science* 31: 950–6.
- Beck, U. (1999) *World Risk Society*. Cambridge: Polity Press.
- Beck, U. and W. Bonss (1989) 'Verwissenschaftlichung ohne Aufklärung? Zum Strukturwandel von Sozialwissenschaft und Praxis', in U. Beck and W. Bonss (eds) *Weder Sozialtechnologie noch Aufklärung? Analyse zur Verwendung sozialwissenschaftlichen Wissens*, pp. 7–45. Frankfurt am Main: Suhrkamp Verlag.
- Beck, U., S. Lash and A. Giddens (1994) *Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order*. 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., J. S. Dietz and M. Gaughan (2001) Scientific and Technical Human Capital:

- An Alternative Model for Research Evaluation', *International Journal of Technology Management* 22: 716–40.
- Bradley, W. J. and K. C. Schaffer (1996) *The Uses and Misuses of Data and Models: The Mathematization of the Human Sciences*. Thousand Oaks, CA: SAGE.
- Brown, J. S. and P. Duguid (1991) 'Organizational Learning and Communities-of-Practice: Toward a Unified View of Working, Learning, and Innovation', *Organization Science: Special Issue* 2: 40–57.
- Brown, J. S. and P. Duguid (1998) 'Organizing Knowledge', *California Management Review* 40: 90.
- Brown, J. S. and P. Duguid (2001) 'Knowledge and Organization: A Social-Practice Perspective', *Organization Science: A Journal of the Institute of Management Sciences* 12: 198–213.
- Brunsson, N. and B. Jacobsson (2000) *A World of Standards*. Oxford: Oxford University Press.
- Bryant, C. G. A. (1995) *Practical Sociology: Post-Empiricism and the Reconstruction of Theory and Application*. Cambridge: Polity Press.
- Burt, R. S. (2002) 'The Social Capital of Structural Holes', in M. F. Guillén, R. Collins, P. England and M. Meyer (eds) *The New Economic Sociology*, pp. 149–90. New York: Russell Sage Foundation.
- Campbell, D. T. (1988) 'The Experimenting Society: Can We Be Scientific in Applied Social Science?', in E. S. Overman (ed.) *Methodology and Epistemology for Social Science*, pp. 290–334. Chicago, IL: University of Chicago Press.
- Campbell, D. T. and J. C. Stanley (1968) *Experimental and Quasi-Experimental Designs for Research*. Chicago, IL: Rand McNally.
- Chelmsky, Eleanor (1997) 'The Coming Transformation of Evaluation', in E. Chelmsky and W. R. Shadish, *Evaluation for the 21st Century: A Handbook*, pp. 1–16. Thousand Oaks, CA: SAGE.
- Cicchetti, D. (1991) 'The Reliability of Peer Review for Manuscript and Grant Submission', *Behavioral and Brain Sciences* 1: 119–86.
- Clark, B. R. (1998) *Creating Entrepreneurial Universities: Organizational Pathways of Transformation*. Oxford: Pergamon.
- Cohen, W. M. and D. A. Levinthal (1990) 'Absorptive Capability', *Administrative Science Quarterly* 35: 128–52.
- Etzkowitz, H. (2002) *MIT and the Rise of Entrepreneurial Science*. London: Taylor & Francis.
- Etzkowitz, H. and L. Leydesdorff (2000) 'The Dynamics of Innovation: From National Systems and "Mode 2" to a Triple Helix of University–Industry–Government Relations', *Research Policy* 29: 109–23.
- Frederiksen, L. F., F. Hansson and S. B. Wenneberg (2003) 'The Agora and the Role of Research Evaluation', *Evaluation* 9(2): 149–72.
- Fuchs, S. and J. H. Turner (1986) 'What Makes a Science "Mature"?: Patterns of Organizational Control in Scientific Production', *Sociological Theory* 4: 143–50.
- Fuller, S. (2000a) *Thomas Kuhn: A Philosophical History for our Times*. Chicago, IL: University of Chicago Press.
- 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, MA: Butterworth-Heinemann.
- Gibbons, M., C. Limoges, H. Nowotny, S. S. P. Schwartzman and M. Trow (1994) *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies*. London: SAGE.

- Gieryn, T. (1983) 'Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Ideologies of Scientists', *American Sociological Review* 48: 781–95.
- Godin, B. (1998) 'The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies', *Social Studies of Science* 28: 465–83.
- Grant, R. M. (1996) 'Toward a Knowledge-based Theory of the Firm', *Strategic Management Journal* 17: 109–22.
- Greene, J. C. (1996) 'Qualitative Evaluation and Scientific Citizenship: Reflections and Refractions', *Evaluation* 2: 277–89.
- Hackett, E. J. (1990) 'Science as a Vocation in the 1990s: The Changing Organizational Culture of Academic Science', *Journal of Higher Education* 61: 241–79.
- 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*. Copenhagen: Samfundslitteratur.
- Hardwig, J. (1991) 'The Role of Trust in Knowledge', *Journal of Philosophy* 88: 693–700.
- Hohendahl, P. U. (2004) 'Humboldt in Amerika? Zur Genese der amerikanischen Forschungsuniversität', *Leviathan* 32: 225–49.
- 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, MA: Harvard University Press.
- Kogut, B. (2000) 'The Network as Knowledge: Generative Rules and the Emergence of Structure', *Strategic Management Journal* 21: 405–25.
- Kostoff, R. N. (1995) 'Research Requirements for Research Impact Assessment', *Research Policy* 24: 869–82.
- Krislov, Samuel (2002) 'Governance', in Kermit L. Hall (ed.) *The Oxford Companion to American Law*. Oxford: Oxford University Press. Oxford Reference Online, Oxford University Press Business School in Copenhagen, 23 Aug. 2004, <http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t122.e0382>
- Kuhn, T. S. (1970) *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press.
- Lassman, P., I. Velody and H. Martins, eds (1989) *Max Weber's 'Science as a Vocation'*. London: Unwin Hyman.
- Latour, B. and S. Woolgar (1986) *Laboratory Life: The Construction of Scientific Facts*. Princeton, NJ: Princeton University Press.
- Leeuw, F. L. (1991) 'Policy Theories, Knowledge Utilization, and Evaluation', *Knowledge and Policy* 4: 73–91.
- Leeuw, F. L., R. C. Rist and R. C. Sonnichsen, eds (1994) 'Can Government Learn?', *Comparative Perspectives on Evaluation and Organizational Learning: Can Governments Learn?*, pp. 125–44. New Brunswick, NJ: Transaction Press.
- Lundberg, G. A. (1939) 'Contemporary Positivism in Sociology', *American Sociological Review* 4: 42–55.
- Lundvall, B. Å. (1997) *The Role of National Innovation Systems in Creativity, Innovation and Job Creation*. Paris: OECD Directorate for Science, Technology and Industry.
- Lundvall, B. Å. (2002) *Innovation, Growth and Social Cohesion: The Danish Model*. Cheltenham: Edward Elgar Publishing.
- Martin, B. R. (2003) 'The Changing Social Contract for Science and the Evolution of the University', in A. Geuna, A. J. Salter and W. E. Steinmueller (eds) *Science and*

- Innovation: Rethinking the Rationales for Funding and Governance*, pp. 7–29. Cheltenham: Edward Elgar Publishing.
- Mayntz, R. and U. Schimank (1998) 'Linking Theory and Practice: Introduction', *Research Policy* 27: 755.
- Merton, R. K. (1973) *Sociology of Science: Theoretical and Empirical Investigations*. Chicago, IL: The University of Chicago.
- Merton, R. K. and H. Zuckerman (1971) 'Institutionalized Patterns of Evaluation in Science', *Minerva* 9.
- Mouritsen, J. (1997) *Tællelighedens regime: Synlighed, ansvarlighed og økonomistyring gennem mål og rammer i statslige institutioner*. Copenhagen: Jurist- og Økonomiforbundets Forlag.
- Nahapiet, J. and S. Ghoshal (1998) 'Social Capital, Intellectual Capital and the Organizational Advantage', *Academy of Management Review* 23: 242–66.
- Nonaka, I. (1994) 'A Dynamic Theory of Organizational Knowledge Creation', *Organization Science* 5(1): 14–37.
- Nonaka, I. and H. Takeuchi (1995) *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.
- Nowotny, H., M. Gibbons and P. Scott (2001) *Re-thinking Science: Knowledge and the Public in an Age of Uncertainty*. Oxford: Polity Press.
- OECD (1997) *The Evaluation of Scientific Research: Selected Experiences*. OECD/GD (97) 194 ed. Paris: OECD.
- OECD (1999) *OECD Science, Technology and Industry Scoreboard: Benchmarking Knowledge-Based Economies*. Paris: OECD.
- OECD (2002) *Frascati Manual 2002: The Measurement of Scientific and Technological Activities*. Paris: OECD.
- Pollitt, C. (1996) 'Justification by Works or by Faith? Evaluating the New Public Management', *Evaluation* 1: 133–54.
- Pollitt, C. (2003) 'Public Management Reform: Reliable Knowledge and International Experience', *OECD Journal on Budgeting* 3: 121–36.
- Popper, K. (1995) *The Open Society and Its Enemies*. London: Routledge.
- Porter, T. M. (1995) *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*. Princeton, NJ: Princeton University Press.
- Power, M. (1997) *The Audit Society: Rituals of Verification*. Oxford: Oxford University Press.
- Rogers, J. D. and B. Bozeman (2001) "'Knowledge Value Alliances": An Alternative to the R&D Project Focus in Evaluation', *Science, Technology and Human Values* 26: 23–55.
- Sanderson, I. (2002) 'Evaluation, Policy Learning and Evidence-Based Policy Making', *Public Administration* 80: 1–22.
- Schwandt, T. A. (2002) *Evaluation Practice Reconsidered*. New York: Peter Lang.
- Shadish, W. R., S. Chacon-Moscoso and J. Sanchez-Meca (2005) 'Evidence-Based Decision Making: Enhancing Systematic Reviews of Program Evaluation Results in Europe', *Evaluation* 11: 95–109.
- Sherman, B. (1996) 'Governing Science: Patents and Public Sector Research', in M. Power (ed.) *Accounting and Science: Natural Inquiry and Commercial Reason*, pp. 170–94. Cambridge: Cambridge University Press.
- Sitkin, S. B. and D. Stickel (1996) 'The Road to Hell: The Dynamics of Distrust in an Era of Quality', in R. M. Kramer and T. R. Tyler (eds) *Trust in Organizations: Frontiers of Theory and Research*, pp. 196–215. Thousand Oaks, CA: SAGE.
- Sonnichsen, R. C. (2000) *High Impact Internal Evaluation: A Practitioner's Guide to Evaluating and Consulting Inside Organizations*. London: SAGE.

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- Stehr, N. (1994) *Knowledge Society*. London: SAGE.
- Strathern, M. (2000) *Audit Cultures: Anthropological Studies in Accountability, Ethics and the Academy*. London: Routledge.
- Toulmin, S. and B. Gustavsen (1996) *Beyond Theory: Changing Organizations through Participation*. Amsterdam: John Benjamins.
- Weber, M. (1972) *Wirtschaft und Gesellschaft. Grundriss der verstehenden Soziologie*. Tübingen: Mohr.
- Weber, M. (1992) *Wissenschaft als Beruf 1917/1919: Politik als Beruf 1919*. Tübingen: Mohr.
- Weingart, P. (2000) 'From "Finalization" to "Mode 2": Old Wine in New Bottles?', *Social Science Information* 36: 591–613.
- Weiss, C. H. (1999) 'The Interface between Evaluation and Public Policy', *Evaluation* 5: 468–86.
- Wenger, E. (1998) *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.
- Whitley, R. (2000) *The Intellectual and Social Organization of the Science*. Oxford: Oxford University Press.
- Wynne, B. (1996) 'May the Sheep Safely Graze? A Reflexive View of the Expert–Lay Knowledge Divide', in S. Lash, B. Szerszynski and B. Wynne (eds) *Risk, Environment and Modernity: Towards a New Ecology*, pp. 44–83. London: SAGE.
- Ziman, J. (2000) *Real Science: What It Is, and What It Means*. Cambridge: Cambridge University Press.

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