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The consequences of evaluation for academic research

Introduction

In recent years new institutional arrangements have evolved at the interface where universities meet industry and government. While research budgets still have a tendency to expand, economic difficulties in many countries set limits to unbridled growth. At the same time some basic scientific fields serve as the underpinnings for new and emerging technologies, with important market potential. Altogether this, and some other factors that will be reviewed, contribute to the current interest in various types of evaluations of research (see also Irvine, 1988). These evaluations, when linked to prospective planning, or research foresight, provide a basis for orienting the directing of science in accordance with national policy objectives and commercial goals (Steed, 1987). Evaluations may thus be implemented to make hard decisions concerning cutbacks and the restructuring of priorities in science. In this paper the current evaluation surge is considered in this broader policy context, and some of the background factors are discussed. A review is made of three different types of settings, and it is argued that the goals and function of evaluations are different in each of these — viz., the commercial setting, the bureaucratic welfare state context and the context of academic research itself. Modes of evaluation in these three contexts, it is argued, are often linked to different modes of steering research. The paper deals with research evaluation in academic fields only, where it is found that evaluations not only have agenda-setting functions, but may also affect the social and cognitive conditions of research work, depending upon the goal and the approach, as well as the characteristics of the field under review.

Background or motive factors

The expansive days of the 1960's are over. In those days R&D efforts, together with education, were considered to be a productive factor on par with labor and capital. Put money into science, and the GNP will increase; this was the slogan of a heroic period of science policy.

Since then, we have had sectorialization policy and the attempt to tie scientific efforts more firmly to societal missions under the sphere of responsibility of governmental ministries. Each has a budget for evolving policy in its domain, and science is one of the tools that can be used. In some countries sectoral research is done in-house or in close conjunction with the Ministry in question. In other countries, like Sweden, the main volume of sectoral research for governmental agencies is carried out by the universities. Hence it becomes an externally

funded, decision-consultancy oriented activity, which may lead its own life, often loosely integrated into the academic research system as a whole. This creates new opportunities in science, new ideas close to practical endeavors, but also tensions and the constant danger of theoretical superficiality and inadequate quality control on the basis of internal criteria.

Externally funded research has increased much more during the past decade than funding to basic faculties in the universities. We are living in a period John Ziman once defined as "bounded science". The volume and cost of research has steadily increased, and the earlier days of heroic expansion are over. At the same time national economies need R&D as a resource to maintain competitive positions on international markets of the 1990's. This is the economic motive, overriding the cultural motive. It also means that selection and accountability pressures have increased. Demands of greater socioeconomic effectiveness also carry over to science policy and research management, where cost-effectiveness calls for reviews of performance. In North America academic positions with tenure require good track records, which increasingly are being measured with bibliometric methods. Good publication counts and citation frequencies can also help in getting salary increases.

In Europe, increased public spending on research also brings with it increased accountability consciousness. In a report from the Committee on Energy, Research and Technology in the European Parliament last year, discussing investments in space science, we read the general statement: "Space policy is undoubtedly a matter of great and legitimate public concern. The issues which it raises tend to come under four headings. First, there is the huge expense involved, and the associated problem of trying to make a sensible cost-benefit analysis. Then there is the strategic and military dimension. Third, there is everything which is implied by the fact that almost all space activity lies at the boundary of our knowledge, if not indeed beyond it. Fourthly, there is, for better or for worse, the vexed question of national prestige. These matters are far too important to be exempt from scrutiny and control, and they therefore represent a direct challenge to the European Parliament. Furthermore it is important to recognize that decision making in space policy is dominated by producer group interests — i.e. the manufacturers and ESA itself. With the increasing practical application of space technology, Parliament has a legitimate and important role in representing the "consumers" of space technology, i.e., the general public." (European Parliament, 25 May 1987).

A similar case might be made for many other high technologies, and their research underpinnings. Effectiveness and efficiency of performance in science is not too much to ask. The question becomes: how and by what methods can one assess and evaluate research so as to enhance efficiency and effectiveness with respect to specified goals, but without jeopardizing the scientific enterprise as such, or its internal dynamics?

A second background factor is more directly related to sectoral funding. The increase of sectorally funded research has in some cases been to the detriment of basic science, and it has introduced serious imbalance into the system. New and important areas of science have been stimulated, but sometimes without ensuring the kind of internal peer review found in older disciplines. Bureaucratic agencies are now finding that they have to introduce some form of quality control alongside assessments from the point of view of societal or sectoral relevance. Evaluation is seen as one way of doing this.

A third factor influencing the growth of R&D evaluations is the advances that have been made in bibliometric methods thanks to the use of the computer and citation indexing. It provides a cheap and simple-minded tool which can be very effective in determining developments on the frontline of science in certain areas and determining who are the key figures associated with these developments. Citation patterns can be studied to determine the apparent growth profile of a particular field like chemical lasers, surface physics, or photoelectronics. Here the advent of the computer as a basic tool, and advanced software comprise new elements of infrastructure in the organization and management of R & D. It is an innovation that has affected accounting practices and legitimatory rhetoric surrounding research, both in the universities and generally. At the same time it provides a tool for prospective planning, or foresight in science and technology. Thus it has contributed to consolidating managerial perspectives and ideologies of science, marginalizing more traditional images and ideals of science. It is not only the introduction of new hardware, software and management methods, but also the introduction of a more clearcut technocratic ideology within science itself. The great advances in bibliometric methods are more apt to feed modes of external instrumental evaluation than modes of disciplinary self-evaluation. This is natural considering the role of evaluation as part of a steering instrument in a bounded economy with strong forces operating to tie basic research to technical instru-

mental knowledge interests.

Externalist quantitative methods tally well with the competence and interests of bureaucratic agencies. Peer review on the other hand is a manifestation of oligarchic academic control. It is discipline and specialty oriented and gives an indication of an individual's or group's recognition in the eyes of academic authorities in the field. Both in its point of departure and in its result, internalist assessment reflects an academic principle of organisation and influence (Dabrawski, 1986: 57). Christiansen (1987) has identified at least seven different types of research evaluations:

1. evaluation concerning staffing and equipment, evaluation of qualification profiles
2. evaluation of activity and environment, as to structure, and/or as to process
3. output evaluation: citation counts
4. effect evaluations: citation counts
5. historical evaluations
6. user evaluations
7. self-evaluations

He has found that most evaluations appear to be focused on outcomes.

Evaluation also varies by context and discipline. Basic disciplines cannot be treated in the same way as applied ones; culturally bound disciplines cannot be treated in the same way as the hard sciences, etc. These are questions I shall come back to later.

Generally it may be said that we are witnessing three modes of steering R&D resources. Struggle goes on between these three modes, and also on the agenda for evaluations. Those who can claim interpretative precedence can also define the key terms in the dialogues between commercial and academic contexts, and between academic and bureaucratic contexts. This is part of the game — and in it three different sets of actors move in complicated alliances and contradictions on the scene.

They are:

commercial interests, often with high technology ambitions and profit motives

administrative-bureaucratic agencies linked to governmental organs of industrial policy making at implementation and/or welfare state trajectories. These may be central agencies, but they may also be local and regional — the latter e.g. in connection with regional industrial policies in the country, or county level health programs involving research and medical technologies

and the academics, responding to relevance and accountability pressures, and split on how to gear up their own self-appointed evaluations, either to accommodate, adapt *or* to challenge and beat the external influences, all in an attempt — they think — to maintain an academic hegemony at least over basic research and research training, perhaps in the name of the autonomy and integrity of the system. It varies with who is explaining the motives.

The conflict or tension between the various modes of steering, and the many different demands put on the modern academic system, has also led to recognitions of an identity and integrity crisis. Positions differ as to which direction to move in:

— a service university oriented towards free public service and closer integration with public policy agendas in welfare society;
— a university with strong commercial contingents, both in research and education (for example, with teaching packages for sale to private firms);
— a back to the basics, to put off all other functions, and instead promote only the excellence of higher education and basic research as part of the progress of human reason and critical thought.

Very few today, I might add, talk about a science for the people. Popular movements, like environmental movements, peace movements and womens' movements can also in their critique of modern society function as evaluators of research, but they do not seem to have the same impact they had ten or fifteen years ago.

As Foss Hansen (1986:457) notes, whereas the academic meritocracy in the 70's was spurred to a *broader* dialogue about research (science for the people), the development today seems rather to go in the direction of a *small* dialogue, between research administrators and scientists, and it is a dialogue marked by the fact that the administrators sit on the locks of the money bags.

Elsewhere in the same article Foss Hansen speaks of how, when bureaucracies are pressed to survey and monitor the productivity of researchers, in order to save money, they do so on the old shopkeeper philosophy — that which is worth something can be weighed — "research can be sorted and weighed like potatoes" (1986:456).

The market forces for their part also tend to generate evaluations that strengthen research with a market value, at the cost of science of a more fundamental nature, i.e., at the cost of basic research. If left alone this also generates a drift away from basic research, just as much as the bureaucracies do.

I think Foss Hansen is partly right in this observation of a *drift away* from the internally academically generated system of norms. At the same time it should be noted that commercial forces today often seem to be more conscious than bureaucrats of the

use of open-ended serendipitous research. In this respect the bureaucrats are lagging behind.

In another paper, Foss Hansen (1987) has used a triangle to depict the dynamics of struggle between the three sets of actors over different modes of steering research, and thus of evaluating it. A modified version of this scheme is presented in Figure 1.

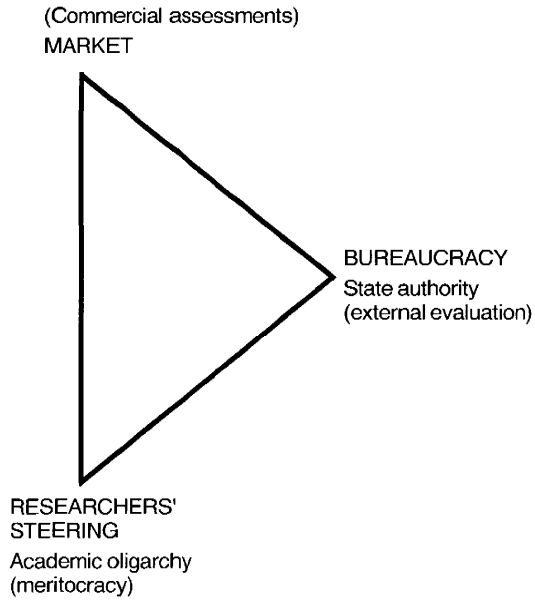

Figure 1: The three actors' triangle involved in evaluation.

This diagram is useful to depict a balance of forces, which in concrete situations will vary from one discipline or specialty to another. Also it should be noted that industry is today interested in some areas of the humanities, but the natural, medical and engineering sciences dominate. The areas of the humanities of interest are linguistics, logic and other fields useful in man-machine interfacing (artificial intelligence), history to boost the tourist industry, religious studies and languages to assist commercial interests in, for example, Asian markets. This utilitarian interest in the humanities is already introducing a differentiation between "useful" and "less useful" disciplines also in this domain.

The commercial context

During the 1970's there was a decline in industrial investments in basic research. In the present decade commercial forces are again making their presence felt, and very strongly so. We find a relative shift of relevance and accountability pressures from the traditional internalist assessment criteria to external commercial ones. This is also a shift that overtakes the earlier externalist pressures that built up during the decade of the 70's, that of the bureaucracies around sectoral research funding, i.e., externally funded research. These agencies are also getting more sophisticated.

Thus we have a focus around new financial and organisational structures or arrangements that channel private monies. We see technology or industrial parks, research villages, little Silicon valleys pop-

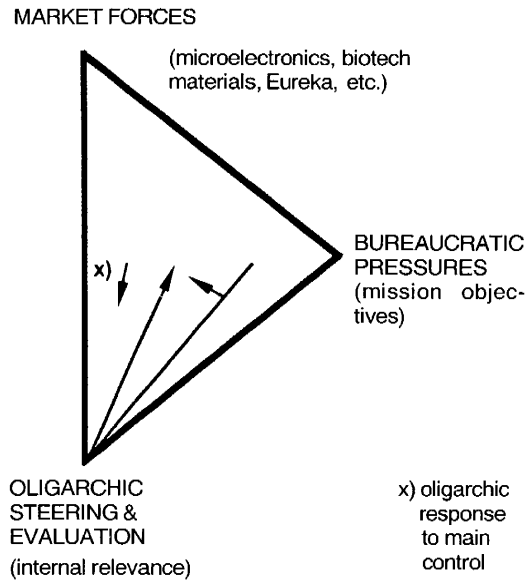

Figure 2: A pull in the bureaucratic and market domains.

ping up around our universities and research labs. We see new university-industry interfacing agencies, like liason bureaus, innovation centers, for technology transfer, for selling services, research, and also courses of teaching.

And we see new forms of patronage — sponsorship by private foundations, venture capital investments and multinational corporations participating in joint ventures on academically embedded projects. For commercial forces it is important to have *a "window"* on basic science. And here evaluations are important. Advanced, new and emerging technology require advanced basic science for their underpinnings. This is also the message of current documents like the OECD's report a few years ago

(OECD, 1984). Last year the OECD has a similar report on evaluation methods, mostly of natural, medical and technical research (OECD, 1987). We also see agencies attempting to build up competence in anticipatory science and technology intelligence — intelligence in the sense of surveillance, scanning monitoring processes that in themselves affect the research communities concerned. Often the exact forecast is less important than the strategic *consensus-building* process that gets minds to converge on certain lines of inquiry. This new type of science policy has also been called "directed autonomy" (Yoxen, cf. Rip, 1988) "orchestration policy" (Rip), or "guided self-regulation" (Rip and Hagendijk, 1988; Rip, 1988).

In a recent study on the rise of biotechnology the author comments: "Many observers have been concerned about the possibility that corporate funding of research may lead to control of the research agenda ...". He goes through a larger number of cases in the U.S. of academic-industrial consortiums, and concludes: "Critics ... are worried about the outside influence on the research agenda focus on the individual and his project — not recognizing that *the act of funding* itself creates the agenda. One need not ask or force an investigator to do specific research — one need only fund the proper scientist to do what he wants" (Kenney, 1986:59).

One's tactic for finding the proper scientist may differ. In most cases however entrepreneurs or venture capital companies approach the scientists after referral from other scientists, who have been picked by setting up top ten science hit lists of persons in a given field. Another way is to announce an invitation for business plans from scientists and then hire consultants to pick among these. A third way is to institute research advisory boards consisting of university departmental chairmen and top science administrators in the multinational corporation. Such boards may also occasionally hire an outside panel of scientists to evaluate the research effort after some years.

Within universities that are on the forefront of biotechnological research in the United States, concern about corporate control of the research agenda has largely *replaced* the earlier concern regarding the academic peer review system. This is in part because corporations now incorporate peer-review mechanisms in their own assessments which are profit-oriented. There is a shift of focus wherein use-value merges with market value. From being use-value oriented, some basic research with high tech potential now has direct *exchange value* on an economic commodity market. We get a commoditization of some types of basic knowledge.

Martin Kenney (1986:131) writes "Increasingly the materials of research are regarded as commodities and therefore no longer acquired on the basis of need but rather for money and... the earlier fragile system of peer pressure and 'old boy', networks is collapsing under the assault of commercialism."

This is in the realm of biotechnology and in the United States. In countries with political, more dirigiste traditions, and where universities are historically *civil service* installations, financed by the national state budget, the situation may not be as dramatic. But it is confused, and the integrity of the academic research system is equally under pressure, challenged by strong commercial forces seeking to make hegemonic inroads and putting up windows to monitor academic R&D.

When research parks crop up, technology parks, sponsorship and new university-industrial relations are put in place, it is mostly without much knowledge of the possible effects on the research system itself. Accountability is left to the discretion of local academic authorities. This is of course good, avoiding heavy-handed bureaucracy, but it must not be forgotten that these are often in a weak position, because public forms of capital and funding are at a minimum. This can breed opportunism and pragmatism.

The institutional changes are posing similar problems regarding:

— the free flow of information
— the skewing of research agendas
— and brain drain of researchers and post graduates from the academic to the commercial sphere.

In the latter connection, evaluation and less formal research assessments may be a cover for "head hunting".

The net effect may be a strong skew from basic to applied research interests.

The bureaucratic context

Government agencies, national boards of energy production, national boards of environmental protection or control of technology development, etc., are in differing degrees developing evaluation methods. In part it is to steer. In part it is to clean up their previous acts of the 1970's, at least in a country like Sweden, where external sectoral funding increased rapidly, while quality control mechanisms were deficient or even lacking in many instances. Now external funding bodies have to increase their credibility in the eyes of academic researchers. Also they want to target intellectual fields to match

their own policy mandates and agendas.

An example of an improvement after evaluation is the Swedish Building Research Council (BRC). The BRC is under jurisdiction of three central government ministries (Housing and Planning, Health and Social Affairs, and Labor). It funnels a large amount of money to research, an amount that has been estimated to be equal to the combined resources of two of the basic research councils (for medical research, and for research in the humanities and social sciences, respectively), to specifically targeted areas.

An evaluation revealed that the BRC Project Officers had a strong element of arbitrariness in the funding of projects. "In a number of cases, reviews were totally absent, and in other cases the number of reviewers was very limited. One also found a tendency that the reviewers predominantly made reference to the relevance of the problem, but statements concerning the problem's scientific prospects or 'researchability' appeared less frequent" (DsBo 1982:2; Elzinga 1985:204). In some cases Project Officers routinely disposed over 100,000 SCr without taking into account internal peer review evaluations of project applications.

The situation created somewhat of a debate in the Swedish media, and an evaluation committee report led to the emphasis of the peer review system. The BRC has created a scientific advisory board, and in a project it has commissioned philosophers of science to give courses in which the differences between internal and external criteria are taken up. This has contributed to raising consciousness concerning the difference between external relevance demands on projects and internal relevance relating to theoretical developments in scientific disciplines. At the same time it has tended to obscure other problems, like changes in the funding mechanisms and the employment situation of externally sponsored sector-project workers, which also need to be discussed.

Another effect of evaluations is that they tend to move individual researchers to change their publication patterns. In the case of architectural researchers funded by the BRC, e.g. at Chalmers in Gothenburg, individuals know that over the next couple of years about ten people are probably going to be terminated when contracts end. In order to get good marks therefore they are told to write more in English and publish in international journals. This is a direct effect of the evaluations and anticipation of coming evaluations.

In disciplines that are culturally bound this has the effect that researchers may devote their efforts to problems and approaches that dominate in the international literature. Thus indigenous schools or traditions suffer. Maurice Kogan and others have found that at some institutions teaching is also affected; it becomes oriented more towards the problems and approaches that coincide with what dominates in the international literature (Kogan & Henkel, 1983). Sometimes this means that teaching becomes less relevant for the future practice of the students, since the courses do not relate to indigenous problems and conflict within the professions occurs.

In Sweden there are about 80 external sectoral bodies, funding R&D for housing, energy, transport, research cooperation with the Third World, and many other sectoral missions whose mandate is politically established at the level of governmental ministries. Their funds range from half a million to over a hundred million dollars. Their priorities change with the changing economic conjunctures and, to some extent, political fashions.

Generally we find that when research becomes strongly linked with bureaucratic networks and policy mandates, it becomes very sensitive to the ups and downs of the stock-market, foreign exchange rates, and the latest fashions amongst politicians. This has also been noted by the research directors of large multinational firms, who prefer to let the universities concentrate more heavily on basic research, which is the strategic reserve for future market competition in high technology.

Recently an evaluation report was put out by the Swedish Energy Research Commission (Efn), together with the Scientific Advisory Board of the previously mentioned Building Research Council and the National Board of Universities and Colleges (UHÄ). This evaluation looked at sectoral research in the field of energy production with particular reference to university research groups. Eight fairly successful university research environments were considered, selected on the basis of an extensive questionnaire survey and investigated with the help of in depth interviews to determine the effect of sectoral funding. A general observation arrived at is that externally funded researchers are often very insecure, especially if they receive funding on a year-by-year basis, in the form of projects. This breeds opportunism. It is also noted how "some institutions have developed contacts with a single sectoral organ, which in turn from its side regards the institution as 'its own.' (Efn-report, 1987).

A careful reading of the Efn-report indicates three things:

(1) external funding mechanisms create a fertile ground for opportunism in research;
(2) loyalty bonds with disciplines are broken or dis-

solved, and they are gradually replaced by new bonds of loyalty, socially and cognitively, with bureaucratic funding agencies within socially mandated sectors;

(3) researchers are groomed like horses in "stables", and they are often kept, not only on a leash, but also lean and hungry, the philosophy being that this creates eagerness.

What we have here is a phenomenon of deinstitutionalization. The influx of external bureaucratic monies creates new bonds and dissolves old ones; it contributes to the constitution of socially mandated research with new reputational systems, and which often integrate *poorly* into the disciplinary research organizations, socially as well as cognitively. Despite all good intentions to the contrary, bureaucratic evaluations to monitor and improve sectoral research,may well reinforce this tendency toward a deinstitutionalization of academic research. (See Figure 3.)

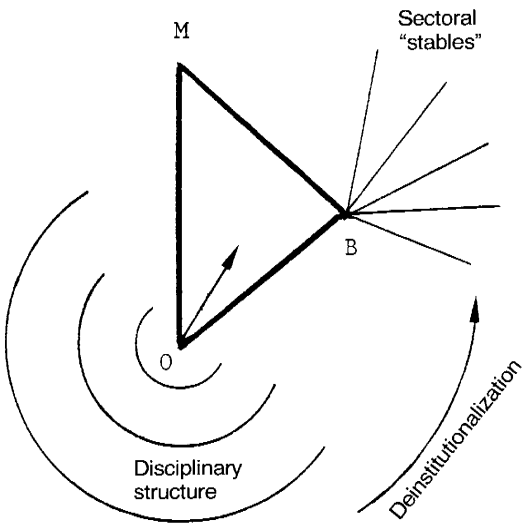

Figure 3: Changing reputational and cognitive structure.

In the figure the rings on the side of the academic oligarchy (0) represent disciplinary structures and loyalties,which are dissolved. The transition is to radial structures centred on bureaucracies (the spines around "B"), representing different reputational (and cognitive) structures, sometimes associated with hybrid communities.

To this may be added that in Sweden there is much talk now of building up long term competency using external sectoral funding. This looks good on paper. In practice, as the Efn report notes, however, the only long term competence in external projects is in the person of the senior researcher, who has a foot in the academic research institution. The rest, many of them doctoral students, hang very loose. They are not integrated into the academic research system. Personnel turn- over is also high. Continuity is low, and long term competency building is thus mostly located in the head of a single individual. If he hops off, the research environment may in one stroke collapse.

It might be added that much of externally commissioned research work has the character of decision-making consultancy. Johansson (1987) argues that researchers in many cases have become decision-consultants for bureaucratic and other agencies. He goes on to plead for the reintroduction of the traditional categories, basic research, applied science and development work, in order to reinforce the internalist perspective of the researchers themselves, challenging the externalist perspective of policy-makers and bureaucratic funding agencies that like to give primacy to their categorizations, which revolve around the acceptance of external steering and decision-consultancy. External bureaucratic evaluations, since they contribute to mystifications in the same direction, also have to be challenged in the same way, at the base of the categories they use as points of departure.

Johansson points out that in fact we have to recognize two different dimensions: the one regarding a spectrum from basic research to applied, to development work. Another covering various degrees of "steering", from internally regulated research to externally steered science.

If we accept the term research for what is decision consultancy, then we are being colonized by the ideology of the decision-makers, the bureaucratic-administrative actors.

Here it is important for theorists and sociologists of science to do a critique of ideologies and ideals of science. Unfortunately some relativist sociologists of science tend to reinforce the idea that science is not about the truth-value of propositions about reality, but rather something entirely socially constructed and therefore negotiable. Facts are the outcome of negotiations. This pragmatism/relativism goes hand in hand with the shop-keeper philosophy of bureaucratic agencies.

Basic research councils

The situation with basic research councils is somewhat different from the sectoral funding agencies. Basic research councils are parts of a bureaucracy too, but these are closer to the domain of the academic oligarchy, because they contain representatives of disciplinary research. At the same time the research councils provide a counterweight to the faculty-funded university communities, and they can cut across these to exercise a strategic profiling influence. The mode of evaluation used is often external peer review, commissioned by the basic funding council.

Let us consider the case of the natural sciences first. They are the hard sciences, not so culturally bound by epistemic affinities with national styles of administration, ideologies or culturally specific traditions. In this sense they differ from some of the social sciences and definitely from the humanities. A positive effect of evaluation in such cases is to increase consciousness of policy questions amongst researchers. It can contribute to give various stakeholders a better picture of investments and profiles of research efforts in a given area across the country, including how resources are used. Evaluation can sometimes function as a diagnostic instrument. It puts the finger on a number of problems or bottlenecks, and brings these to the surface for discussion.

The success of these functions presupposes an active feedback relationship from the evaluation committee back to the community concerned. This might be in the form of workshops and conferences with policy-makers, bureaucrats from various levels, and research workers. It also presupposes that the evaluators have a knowledge of the science policy and funding system of the country in question.

This latter is a point made by a recent expert evaluating committee that was in Sweden for a week on a fact-finding mission in January 1987, to evaluate certain chemical and biological fields under the theme of "Structural chemistry with diffraction methods" (International Evaluation of Structural Chemistry, 1987). They observe: "a complication arose from the general ignorance of the Evaluation Committee members with respect to science funding and academic policy in Sweden. The Evaluation Committee would have benefitted from a thorough discussion of the funding process, including how funds are distributed among disciplines, how the Council makes its decisions on individual projects, and some examples of projects that have been declined..." (p. 2). Information on the level of teaching commitments of individuals and groups is also felt to be useful. This is often something that is overlooked, especially in so-called objective external evaluations using bibliometric measures.

As already indicated, evaluations often lack the necessary feedback structures, and hence they cannot be part of a learning-curve process. In absence of this they can only point to surface aspects, and fail to focus attention to deeper-level structural ailments. Indeed, they can *divert* attention *away from* such factors as faulty funding mechanisms, inadequate career structures, and so on, in the academic research system. This being so, the onus of attention (and blame for poor performance) is placed on the performers of research, when in fact it may be the funding agencies, their bureaucracy, narrow-minded policy goals at a higher level, or the year-to-year project funding type of support that creates difficulties, and which should therefore be evaluated instead. The spotlight of evaluation should in many cases equally be turned onto the funding agencies themselves, on funding mechanisms, and also on bureaucratic-administrative structures and bonds in the academic research system and outside it. In other words, the evaluators must be evaluated, from the point of view of a political epistemology of science.

Epistemic drift and other consequences

With evaluation and targeting at reseach councils we find here a form of strategic thinking introduced into basic research. This is also reflected in the vocabulary used by many research councils: "targeted research areas", "strategic research", or "priority focal areas", etc. Many observers have noted how this amounts to a kind of externally motivated orchestration of scientific fields. It also involves an internalization of external norms or regulatives into the body of basic research, or a shift from internal to external criteria. This is the phenomenon I have elsewhere (Elzinga, 1985) called "epistemic drift", a drift from a predominance of internal to a predominance of externalist evaluation criteria. Epistemic drift can thus be understood as the shift from the traditional system of control in knowledge structures, based on internal peer review and disciplinary reputational systems to externally based regulatives and controls. The latter may especially crystallize around sectoral functions of knowledge utilization, but also around anticipations of emerging technologies.

In the case of a strong bureaucratic regulative, in the social sciences we may find that research

efforts tend to adapt, i.e., they begin to show greater epistemic affinity with the administrative-bureaucratic image of science. At a deeper level it is the ideal of science that is affected and hence basic criteria for assessing research efforts.

Many observers have also pointed to two other tendencies:

(1) a strong orientation toward international research fronts. All countries' efforts also tend to converge on the research underpinning the same clusters of technologies, microelectronics, biotechnology and advanced industrial materials. Nations have special high tech programs for these areas.
(2) a development of conflicts, opening of tensions between different schools or traditions. This is the case of the culturally bounded sciences.

The net effect of evaluations may thus be that certain internationally oriented traditions, often quantitative ones, become strengthened, while phenomenological or other traditions in a field are weakened. Within the social sciences there have been open struggles and debates in psychology, pedagogy and sociology around evaluations and reviews.

Obviously bibliometric methods create contradictions within culturally bound disciplines. In the humanities where the cultural boundedness is even greater such methods become rather absurd. For example a citation count of all professors, docents and Fil Dr researchers in Nordic Languages in Sweden during a two year period showed a total count of 22 citations for all of them in the citation indices. The number for all Swedish ethnologists was somewhat similar, even less. This may be compared with psychology where there were over 2000 citations over the same period (again reflecting especially one or two particular schools) (Hemlin & Montgomery, 1987). In another study by Sven Hemlin and Henry Montgomery (1985) in Gothenburg, the authors find that among negative effects cited by researchers interviewed about evaluations, the three main aspects were:

— evaluations lead to a strong steering effect in academic research:
— evaluations lead to research becoming adaptive to mainstream paradigms or schools or fashions;
— evaluation can give rise to "wrong research", i.e., "wrong" directions of research (see also Hemlin & Montgomery, 1987).

An orientation of academic activities to the international research front defined by publications (i.e. visibility) and journals often means orientation to non-periphery, i.e., center countries like the U.S. But this also in some cases can mean a certain uniformitarian tendency — that more and more the same topics and similar approaches dominate. If this is so it is a form of adaptation to a greatest common denominator or a niche in it.

The so-called internationalization of research in a country may at closer analysis reveal itself to be an orientation to non-periphery (i.e. center) country research agendas, as pointed out by Veronica Stolte-Heiskanen (1987 a, 1987 b) and others (cf. Fuhrman & Kaukonen, 1987). This strengthening of center-periphery relations means that countries like the U.S., Britain and France tend to dominate. While for a smaller country this adaptation to the greater common denominator may mean a growing gap between research and practice.

The bifurcation along "school" or paradigm-lines is also significant. Here also orientations that have a greater affinity with indigenous ideological issues, national traditions and values have a disadvantage. Their representatives may clam in on themselves, defensively. Thus we get the same division we have found in the humanities, between traditionalists and pragmatists.

Civil Society, the weakest link

One final issue that must be taken up here concerns *alternatives* . What has been discussed here are officially commissioned evaluations in various contexts, the commercial, the bureaucratic and the basic research contexts. We have focussed on the dialogues between the oligarchic academic communities and their external funders. What is missing here is a fourth point in our diagram, which would turn it into a quadrangle. I am thinking of "civil society", represented by spontaneous interests of various groups and non-propertied classes of people. This dimension is largely absent in the discussion of evaluations of research, because demands and assessments from this side are not very well articulated. Articulation of interests here often presupposes the existence of a popular movement, like the peace movement, the anti- imperialist movement, the environmentalist movement, a student protest movement, a women's movement, or a radicalized labor movement free of bureaucracy and corporativism.

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