

Hanne Foss Hansen

## Control and organization of research: a case study of humanities departments in Denmark

### Introduction

Research on research, especially the sociology of science, has been preoccupied with the theme "control of research" for as long as the field has existed. Two distinct perspectives have developed: The internalist perspective, which sees the development of research as determined solely by structures and processes inside the scientific community, and the externalist perspective, which sees the development of research as susceptible to influence from structures and processes in the society at large.

The debate about internalism versus externalism focuses on the origin of control and influence. Another important question concerns which forms of control, i.e. what kinds of mechanisms canalize control? Is control primarily bureaucratic control, that is social influence exercised top-bottom in hierarchies, for example through rules, regulations, plans, orders, etc.? Is it market control, competition for scarce commodities, exchange of goods, and quid pro quo? Is it democratic control, social influence exercised from bottom-top in the hierarchies, joint decision making? Is it control by norms, culture, values, traditions? And/or is it control by dialogue, by the formation of knowledge through discussion, exchange of experience and criticism?

Within the internalist perspective models alter-

natively emphasize bureaucracy, market, democracy, norms, and dialogue as important mechanisms of control. Those who consider bureaucracy as the most important mechanism of control, see the hierarchy of authority between senior and junior researchers, the elite structure, and the reward and resource distribution systems within the scientific community as the most important mechanisms of control. (See for example Cole & Cole, 1973; Cole et al., 1977, 1981; Zuckermann 1970, 1977; and for a more critical contribution Broad & Wade, 1982.)

Those who consider the market the most important mechanism perceive the scientific community as a market in which information, in the form of results, is exchanged for recognition, credit, grants and so on. (Polanyi, 1962; Hagstrom, 1965; Bourdieu, 1975; Latour & Woolgar, 1979 are central contributors.)

Those who consider democracy the most important mechanism of control attach importance to the autonomy of research institutions, to the internal democratic structure of the institutions, and to the traditions for research freedom. (Fridjónsdóttir, 1983 discusses this historically while Pedersen, 1986 analyzes the development in Denmark in the 1970's and 80's.)

Those who consider norms the most important mechanism of control see researchers' conduct, and consequently the development of research, as

determined by fundamental norms within the scientific community: universalism, communism, disinterestedness, organized skepticism, and emotional neutrality. Or, on the contrary, they see the development as determined by counter-norms: particularism, solitariness, interestedness, organized dogmatism, and emotional commitment. (See Merton, 1957, 1968; Barber, 1952; Storer, 1966; Barnes & Dolby, 1970; Brante, 1980; Stehr, 1978; Mitroff, 1974; Mulkay, 1980.)

Finally, those who consider processes of dialogue the most important mechanism of control attach importance to communication and diffusion of knowledge within the networks of researchers. (The works of Price, 1963; Crane, 1972; Mullins, 1972; Griffith & Mullins, 1972; Law, 1973; Collins, 1974, are central here.)

The externalist perspective, on the other hand, is less distinct in its view of mechanism of control. In general, views of control are here more combined. Galtung (1977), for instance, perceives the scientific community as a reflection of the society in general. A scientific elite controls the development. But the elite can be replaced from below. This idea emphasises control as composed of bureaucracy and democracy.

Others have more differentiated views. The theory of finalization (Böhme et.al., 1976; Krohn & Schäfer, 1976; Böhme, 1977; Pfetsch, 1979; Schäfer, 1979; Elzinga, 1982) points out that control is composed of norms and dialogue. Disciplines are developed through three phases: 1) An exploratory phase characterized by disagreement about theory and strategy; 2) a paradigmatic phase characterized primarily by internal theory development and, finally, 3) a post-paradigmatic phase characterized by finalization and application of theory. External control is important in the exploratory and, especially, in the post-paradigmatic phase. Here norms make the researchers turn towards the solution of practical problems as conceived by professions, clients etc., just as networks are created which include both scientists, citizens, and politicians.

Still, other authors apply different views to the question of control. Knorr-Cetina (1981), for instance, seems to perceive control as composed of processes of dialogue combined with market mechanisms, while Whitley (1984) has developed a theory which could be named differentiated externalism. The point is that disciplines are organized and controlled in several ways, depending partly upon the extent of the interdependency between the researchers within the discipline, and partly upon the degree of task uncertainty in respect to

choice of problems and methods.

This is not the place to elaborate upon these theories. However, they show the richness of the theories about control of research in the field of sociology of science. It is characteristic that most of the theories are universalistic. Apart from the differentiated theories developed in the last couple of years (the finalization theory and the works of Whitley), they are searching for the model for explaining organizations and control of research. A very ambitious aim, in my opinion.

Because of the theoretical richness, it becomes empirically interesting to analyze how the researchers themselves experience the question of control. In other words: How do researchers in different kinds of basic units experience and explain influence and control as applied to actual research activities?

### **An empirical study of control of research: design and methodology**

The question of control was explored in an empirical study of basic units within the higher educational system in Denmark. The study was carried out during 1983—1986, and included four basic units; i.e. four departments at the faculty of humanities, the departments of English language, of the history of literature, applied and mathematical linguistics, and phonetics.

The study focused on the following problems:

- How do researchers experience the situation of control surrounding their research?
- Where does inspiration as to choice of research problems come from (formal versus informal organization, internal versus external experience)?
- Which mechanisms of control affect their choice of research problem?

The study is based on documentary material such as annual reports of research activities, project descriptions, etc., and, most importantly, interviews: 22 researchers were interviewed each for 1½—2 hours. The interviews were semi-structured. Topics were organized in an interview guide, but the interviews were conducted as dialogues. All topics were covered in each interview, but the time spent on specific topics varied from one interview to another. The interview guide was formulated in a way that tried to cover all imaginable ways of influence.<sup>2</sup> All interviews were taped, typed, and sent to the interviewees for approval. All respondents had at least five years of research experience, most of them more.

In Denmark, practically all senior researchers

teach as well. They spend approximately 50 % of their time on teaching, 40 % on research, and the last 10 % is spent on administrative tasks. The present study is focusing on units' research activities. Teaching and administration are only interesting to the extent that these tasks either inspire, influence or disturb research.<sup>3</sup>

### Variations among the basic units

As the following discussion shows, one of the main results of the study is that the basic units clearly differ from each other with respect to tasks, structure, orientation towards the environment, etc.

The department of English language (unit 1) is a large department with about 40 researchers. Tasks are very varied, covering English language (grammar, semantics, phonetics, phonemics, lexicography, etc.), literature and culture (British, American and African literature, literary theory, etc.) and social conditions and history of England and America, as well as the relations between these countries and Denmark.

Research is traditionally and typically organized individually. Most researchers are specialized in a relatively narrow field. Team research, however, is becoming more common especially in the field of English language. Collaboration and dialogue across the main fields (language, literature, history) is almost totally absent. The department grew rapidly in the sixties and the first half of the seventies, but has subsequently been under pressure for heavy cutbacks. Growth as well as cutbacks are determined by educational policy. The department educates Masters of Arts (M.A.) primarily aiming at employment in high schools and colleges.

The department of literary history (unit 2) consists of 10 researchers engaged in the fields of literary history, literary theory (studies of the works of selected authors, selected genres, etc.) mass communication, and women's literature. Research is organized individually as well as in teams. Several researchers are engaged in cross-disciplinary research activities.

Traditionally, the department has been engaged in basic research. Conference papers and articles in Danish and international scientific journals have had a considerable impact on the publication profile of the university. In recent years, however, the majority of the researchers have been engaged in writing a new Danish history of literature. This work is best characterized as an attempt to communicate results from the last twenty years of research to the attentive public. The department educates M.A.s,

who are employed in very different types of jobs within the cultural sector.

The department of applied and mathematical linguistics (unit 3) consists of 10 researchers engaged in the following fields: Problems connected to the learning of foreign languages, the importance and form of written language, the use of words in different contexts, computer based analysis of language, and the psychology of language.

Research is mainly applied and, contrary to the other basic units, relatively goal-directed, e.g. to describe high school students' most common errors in written English, to describe the frequency of a specific word in different contexts, to evaluate the suitability of existing equipment for linguistic purposes or to develop a mechanical translation system to be used in the EEC. Many tasks are specified by clients outside of the department.

Research is typically organized in interdepartmental teams. Internally, the department is not characterized by much collaboration, but informal dialogues are widespread. The department has recently started a course in applied linguistics.

The department of phonetics (unit 4) works on the basis of natural science methodology. The department is small, consisting of 6 researchers. They work within the fields of experimental phonetics (the function of the larynx in speech, intonation, artificial speech and perception/recognition of speech) and phonemics (description of modulation and stress in different languages).

Traditionally the department has only been engaged in basic research, but applied aspects have become more prominent during the last few years, for instance in the field of artificial speech, where some of the researchers have worked on the development of a text-to-speech machine for the Danish language, a machine that is able to read texts written in Danish to be used by blind people.

Experimental phonetics require instruments. The number, type, and characteristics of the available instruments determine the choice of research objectives. Thus, decisions on purchase of instruments become very important. As the use of instruments is important in connection with research, the researcher is forced to work in the department's laboratory. Thus, very little research can be conducted from the home, which is common practice for researchers in the other units. The department educates very few M.A.s. The majority of the teaching covers basic phonetics for students of foreign languages.

Figure 1, which shows a simple model of a basic unit and the most important parts of its surrounding environment, can be used for comparing the

units. The model outlines five main groups in the environment: The scientific community, inside which the networks may be primarily disciplinary or cross disciplinary and primarily international or national; the profession, defined as an occupational group working in practice on the basis of general knowledge developed within the discipline; clients, defined as groups directly using specific output from the unit, e.g. students and organizations requiring specific research activities; the attentive public, defined as agents with a general interest in the discipline; and finally, the institutional hierarchies of which the basic unit is a part, the faculty, the university, the research councils and the organization around them and The Ministry of Education and Research. (The model is inspired by the work of Eckhoff, 1967. The concept "attentive public" has been suggested by Premfors, 1986).

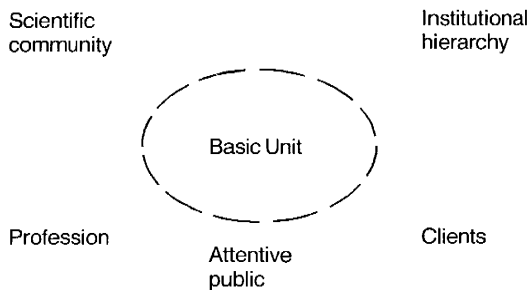


Figure 1: The basic unit and its surrounding environment. A simple model.

In terms of the model, unit 1, can be characterized as primarily orientated towards the scientific community with disciplinary orientation, and to a lesser degree orientated towards the profession. It is a standing discussion in the department whether research ought to contribute primarily to the development of knowledge in the scientific community, or to the solution of problems and development of practical knowledge in relation to the Danish society, to the profession and to the clients.

Unit 2 is orientated towards the scientific community and has a disciplinary as well as a cross disciplinary orientation. During recent years, the department has primarily been engaged in the communication of research results to the attentive Danish public. Earlier, the department was more engaged in exchange of knowledge related to the scientific community. This topic will, according to the researchers, be reassumed.

Within the Danish society, the department is characterized by close relations to an attentive public in the general cultural sector (literature, publishing, television etc.).

Finally, research activities in this unit seem to be closely connected to the development of education. Several of the researchers actually find it difficult to distinguish at all between the two activities.

Unit 3 is primarily orientated towards clients and their problems. Relations to clients are important with respect to choice and planning of activities. Clients often directly formulate research projects. Relations to other researchers in the form of cross disciplinary networks have some importance in developing solutions to problems. No profession as such exists in the environment of the department, but it is in the process of being established as a result of the newly started education.

Unit 4 is orientated towards the scientific community, disciplinarily and internationally.

Recently, new agents in the form of clients seem to have established closer relations to the department. Several researchers have been engaged directly in treatment, development of new technology, etc. A distinct profession cannot be said to exist. Relations to students are mostly one-way communication, transferring knowledge from researchers/teachers to students.

The relations between the basic units and their environments are summarized in figure 2. Input relations describe the groups in the environment that inspire and influence the research activities, while output relations describe the "audience" in relation to the unit's products. In each box, the first mentioned group is most important, according to the unit profile, the following is the second most important according to the unit profile as a whole, and so on.

It is interesting that, according to the researchers themselves, the institutional hierarchies, which provide the majority of financial means for the basic units, have no influence at all as to control of research. The scientific community, the profession, the attentive public, and different groups of clients are all possible agents in the control process, but not the institutional hierarchies. Researchers only respond to attempts of control from institutional hierarchies if they match developing research activities. Furthermore, the institutional hierarchies are very important in the long run, especially because of the tight coupling between research and education. The institutional hierarchies are important in respect to decisions concerning the conditions for research.

When the English language department is cut

Environmental relations		
Unit	Input:	Output:
1		
Foreign language	— scientific community — profession	— scientific community — profession — clients: students
2		
Literary history	— scientific community — clients: students — attentive public	— attentive public — clients: students — scientific community
3		
Applied and mathematical linguistics	— clients: orders/buyers — scientific community	— clients: orders/buyer — scientific community — clients: students
4		
Phonetics	— scientific community — clients: orders/buyers	— scientific community — clients: students & orders/buyers

Figure 2: Basic units and environments

back because of the educational policy, this will naturally be reflected in a decreasing amount of research. However, the institutional hierarchies seem unable to exert any influence on how this process affects the research profile and research planning in the unit.

### Basic units as open, natural, and loosely-coupled organizations

The similarities between the four basic units can be summarized like this:

- 1) Basic units are open, natural, and loosely-coupled organizations
- 2) Research activities in basic units are influenced by a complex variety and mixture of control mechanisms that work across the borders of the units.

Agents in the environment influence research activities in all basic units. In other words, the borders of the units are open. One may say that environmental control is “filtered” through unit traditions, culture, and interests. Only attempts of control, which match the profile of the unit and one or more of the researchers’ become important.

The internal difference of the basic units in respect to tasks, structure, orientation, etc. is matched by external differences. Research activities are

more strongly connected to activities and agents in the environment than to the unit as such. Thus, the basic units can be described as loosely-coupled organizations. This does not mean that there is no internal integration. Internal integration, however, primarily takes place through other activities than research, mainly through teaching.

Basic units are not clearly delimited from the environment, but have a delimitation zone which is difficult to point out precisely. The units typically consist of a group of core members (permanently employed) and a group of associated persons (temporarily employed, visiting researchers, part-time teachers doing research in their spare time, students involved in research, etc.). Size and composition of the mentioned groups differ over time, which make basic units “fluid” organizations.

Much energy is used on regulating the inner delimitation, i.e. the group of core members, while hardly any energy is exerted on regulating the outer delimitation. The processes of regulating the delimitation become visible especially in connection to filling of vacancies and/or cut-backs. In these situations researchers form coalitions and the units begin to resemble a political system.

Another kind of loose-coupling in basic units is often found in the relation between the formal structure of the unit and the research activities. The conditions for research are laid down in the formal

structure, but in many respects these conditions do not directly influence the choice and planning of activities. For example: Once permanently employed in a basic unit one can practically engage in almost any research one wishes as long as the argument is that the activities are a continuation of previous activities in the unit. In other words, the research culture is characterized by pluralism within regulated limits.

Finally, pluralism also means that in respect to research, basic units typically have unclear objectives. Many research activities, as well as the researchers themselves, have unclear objectives. As such there is typically disagreement about the objectives in the unit. When objectives are explicitly formulated in basic units, it is usually done later. This means that objectives are developed and formulated while research activities are going on rather than before the start of the activities.

### **The variety of control mechanisms**

A variety of control mechanisms are of importance. Dialogue, norms, and markets directly canalize control, while bureaucracy and democracy constitute the settings of basic units and thereby canalize control more indirectly.

Dialogue is an important mechanism of control within research. One form of dialogue may be named "research engenders research", another "dialogue in networks".

The process "research engenders research" is a mechanism of control that is built into the research process itself. It is the very logic of the development of research processes. Research creates results (knowledge, understanding, etc.), but research also uncovers needs for new research. One may say that processes of research leave just as many problems unsolved as they solve. Consequently, new, uncovered, unsolved problems are most often taken up either by the same researcher (research team) or by others. The dialogue between problems, theory, empirical data, etc., in itself creates new problems.

Another important mechanism of control is dialogue in networks. Figure 1 shows that researchers form part of different kinds of networks composed of researchers, of occupational groups involved in practical work on the basis of scientific knowledge, of clients, etc. In these networks, knowledge and ideas are exchanged, just as problems, methods, strategies, and results are discussed. These processes of dialogue often inspire and influence researchers.

Norms, or culture (values, traditions, etc.) is another important mechanism of control in research. Norms are related to several levels within the research system: to formal basic units (departments), to institutions, to disciplines, and to the scientific community as such. They may effect the researchers' choice of problems, theoretical approach, methodology, etc.

In general, norms and culture constitute the frames which separate legitimate research from illegitimate research. Norms and culture may change over time, but in the short term they constitute important mechanisms of control.

Market mechanisms related to research and teaching constitute a third important mechanism of control. Markets are defined as situations where several agents compete for scarce commodities. Such markets are found on different levels within the higher educational system, and they exist around different kinds of commodities.

Firstly, several markets surround the researchers as individuals. Researchers see themselves as agents in the market for positions, for tasks (certain kinds of research tasks give more prestige than others), for publishing (researchers compete in getting their articles and books published in certain periodicals, by certain publishers etc.), for teaching (they compete for students and for certain teaching tasks, especially teaching on the highest levels), as well as grants (i.g. grants from science councils). Their judgement of the market conditions influences their choice of research activity.

Secondly, there are several markets connected to the organizational level, both around the basic units and around the institutions. Basic units within related fields compete, for example, for tasks, grants, and intake of students. Judgements of markets once again influence the choice of strategy of the basic unit.

Several of the markets mentioned above are interconnected. The market for positions is connected to the publishing market, because evaluation of the scientific production constitutes the basis for appointments. However, the market for positions is also connected to the market for teaching, because positions can be formulated and advertised on the basis of the need for teachers. Moreover, the market for positions is connected to the market for grants, because within the research system, which is financially based upon a bipartite system, grants from science councils make up the supplementary possibilities for a position, etc.

Thus, there are several types of markets. Some are economic markets, some are not. Some directly influence the choice of research activity (positions,

publishing, grants), while others are of more indirect importance (teaching). However, all markets influence the development of research, just as the richness of markets in the higher educational system stresses the complexity of the organizational structure, internal differentiation as well as differentiation of environment.

Democratic ideals penetrate the higher educational system on all levels. Regulation establishes a system whereby institutions choose their own research activities. Basic units regulate their limits, primarily through formulation of appointments, but once researchers are permanently employed, they decide themselves what activities they wish to engage in.

In spite of democratic ideals, bureaucracy is in certain situations a mechanism of control. In general, researchers do not feel that choice of research activities is determined by an elite within the national or international scientific community. In other words, researchers do not consider research as subject to the authority of the scientific community. However, they feel that they have to write in the tradition of the scientific community in order to compete on the market for positions. This could be characterized as a kind of indirect bureaucracy, as a mechanism of control. Junior researchers have to adapt to the traditions in order to remain in the system, but creative adaptation is preferred. There are many contradictions in the higher educational system.

One may also speak of indirect bureaucracy as a mechanism of control in relation to environmental control. In the institutional hierarchy conditions for basic units are determined. Although there is no direct influence upon the choice of activities, these conditions influence the "climate" of the units either negatively or positively, which in turn influences the involvement of researchers.

### Summary and conclusion

Above, I have argued that basic units within the higher educational system are characterized by richness. Tasks, structure, environmental relations, etc. are differentiated. At the same time, however, basic units are characterized by similarities. In general they are open, natural and loosely-coupled organizations. This means that there is no direct determinism between environmental research needs and the research activities of the scientific community and the basic units. On the other hand, this also means that there is room for external research needs, which may, however, to some

extent be depending upon structure, culture, traditions, etc., in the basic units.

The study shows that a variety of control mechanisms are of importance. Some of these (dialogue, norms, and markets) directly canalize control, while others (bureaucracy and democracy) work more indirectly by influencing the conditions of doing research.

In relation to the discussions about internalism versus externalism, this study points out that both perspectives are relevant and fruitful. Both perspectives contribute to a total understanding of the development of research. Separately, however, the perspectives are not sufficient.

The study has focused on four humanities departments, and one could reasonably ask, whether the results would have been different if other fields of science had been represented. For seven years I have been engaged in social science research. When I think of the three basic units I have been working in, I find that they correspond with the results of this study.

When it comes to other fields of science such as for example natural science, technical science, and medical science things are somewhat different. Within the humanities and the social sciences, the development of theory is of great cross-national interest whereas empirical data and consequences for practice are of less importance. Within other fields, the development of theory as well as empirical data and consequences for practice attract international interest. This may have implications for basic units' orientation in relation to environment.

In relation to the universal scientific field this study raises an important question: What is actually revealed about the concept of the basic units? The study shows that it is important to analyze basic units in terms of both formal and informal structures if we wish to understand the process of research. In other words, one should focus on basic units in the form of departments and institutions as well as networks.

Organizational studies within the field of higher education studies (March and Olsen, 1976; Enderud, 1977; Mintzberg, 1983) have attached much importance to the formal structures of research organizations (departments, faculties, etc.) while studies in the field of the sociology of science have stressed the importance of informal structure (primarily networks in respect to the scientific community).

Future empirical research should include both aspects, a fact which has also been stressed by the so-called macro perspective (Clark, 1983). How-

ever, the present study shows that the point is relevant from a micro perspective too.

Another important universal question emerges from the study: What implications do the results have for research policy? The richness of the higher educational system illustrated by this study has two obvious implications for research policy. In order to match the richness, research policy ought to be differentiated as well as flexible and allow for a greater amount of latitude.

Different fields of research have different kinds of needs. Some fields, for example, need a lot of resources connected to travels abroad, others need resources for instruments, salaries, books, etc. Within some fields, it is possible to define research by the description of research projects, while other fields are confronted with restrictions if they wish to do research connected to specific projects.

Research activity in general is characterized by a high degree of task uncertainty. Research policy, therefore, ought to give researchers freedom to act, e.g. freedom to stop, extend, or alter activities. In other words, changes in intentions and plans ought to be legitimate, even welcome. Changes most often reflect the fact that the researchers have become wiser.

What has been said above implies that research policy ought to be decentralized as much as possible. It should be developed and formulated close to the fields, organizations, and institutions in question, and in dialogue with agents in the environment.

In terms of the discussion of different forms of control, this means that the use of bureaucracy in research policy ought to be minimized (although we all know it is impossible to avoid it completely). Bureaucracy is a very suitable form of control of routine tasks, but this is certainly not a characteristic of research activity. Therefore, future research policy should be based upon control through democracy, norms, dialogue, and to a certain extent markets.

Unfortunately, the present Danish research policy does not seem to develop in that direction (Foss Hansen, 1986a, and 1988). On the contrary, there is an increasing tendency towards basing research policy on the mechanisms of bureaucracy and markets at the expense of the more traditional form of control through the academic oligarchy.

## NOTES

This article presents some of the main discussions and results from my Ph.D. thesis. Theoretical perspectives as well as analyses and interpretations of material from the empirical study are further elaborated in Foss Hansen (1986a and 1988).

1. The frame of reference used in this article concerning different forms or mechanisms of control are inspired by Hernes (1978) and further developed by Larsen (1981) and Beck Jørgensen and Larsen (1982). The concept of control is defined as that social influence of agents which results in a change of behaviour.
2. In all interviews the following subjects were covered: Background for and contents of ongoing research, collaboration and contacts around research activities, conditions and practices in respect to publishing, relations between research and teaching, fundamental ideas and conceptions in respect to science, research climate and culture in the department, resources and conditions (grants, technical assistance, division of labour, teaching and administrations etc.) and finally, personal questions about age, education, degrees etc.).
3. The topic of interaction between the activities of teaching and research are analyzed separately in Foss Hansen and Jensen (1985a and 1985b). A more extensive study of this topic can be found in Jensen (1986).

## REFERENCES

- Barber, B.  
1952 *Science and the Social Order*. New York: The Free Press.
- Barnes, S.B. and R.G.A. Dolby  
1970 "The Scientific Ethos: A Deviant Viewpoint." *European Journal of Sociology* 1: 3—25.
- Beck Jørgensen, T. and B. Larsen  
1982 "Styring et forsøg på teoridannelse" (Social Control: An attempt to Theory Formulation). In Flemming Agersnap et. al.: *Forskningsstyring og forskningsmiljø* (Control of Research and Research Environment). Copenhagen: Nyt fra Samfundsvidenskaberne.
- Böhme, G.  
1977 "Models for the Development of Science." In a Spiegel-Rösing and D. de Solla Price (eds.): *Science, Technology and Society*. London.
- Böhme, G., W. van der Daele and W. Krohn  
1976 "Finalization in Science." *Social Science Information* 15: 307—330.
- Bourdieu, P.  
1965 "The Specificity of the Scientific Field and the Social Conditions of the Progress of Reason." *Social Science Information* 14: 19—47.
- Brante, T.  
1980 *Vetenskapens struktur och förändring* (Structure and Change in the Sciences). Lund: Doxa.
- Broad, W. and N. Wade  
1982 *Betrayers of the Truth*. New York: Simon and Schuster.
- Clark, B.R.  
1983 *The Higher Educational System. Academic Organization in Cross-National Perspective*. Berkeley: University of California Press.
- Cole, J. T. and St. Cole  
1973 *Social Stratification in Science*. Chicago: The University of Chicago Press.
- Cole, Stephen, L.R. and J.R. Cole  
1977 "Peer Review and the Support of Science." *Scientific American* 237 (October): 34—41.
- Cole, St., J.R. Cole and G.A. Simon  
1981 "Chance and Consensus in Peer Review". *Science*: 214.



- Collins, H.M.  
1974 "The TEA set: Tacit Knowledge and Scientific Networks" *Science* 4:165-186.
- Crane, D.  
1972 *Invisible Colleges. Diffusion of Knowledge in Scientific Communities*. Chicago: The University of Chicago Press.
- Eckhoff, T.  
1967 "Vitenskaper, professioner og klienter" (*Science, Professions and Clients*). *Nordisk Forum* 5/6: 304—316.
- Elzinga, A.  
1982 "Forskningspolitikken og den liberale korporativismen" (*Research Policy and the Liberal Corporativism*). *Sociologisk Forskning* 4: 39—63.
- Enderud, H.  
1977 *Four Faces of Leadership in an Academic Organization*. Copenhagen: Nyt Nordisk Forlag.
- Foss Hansen, H.  
1982 "FORSK Et case om styreformen på et større forskningsinstitut" (FORSK — A Study of Social Control at a Large Research Institution) in Flemming Agersnap et. al.: *Forskningsstyring og forskningsmiljø (Control of Research and Research Environment)*. Copenhagen: Nyt fra Samfundsvidenskaberne.
- Foss Hansen, H.  
1986a *Styring af forskning. Vilkår og muligheder (Control of Research. Conditions and Possibilities)*. Copenhagen: Institut for Informatik og Økonomistyring. Unpublished thesis.
- Foss Hansen, H.  
1986b "Udviklingstendenser i dansk forskningspolitik: På vej mod bureaukrati og marked" (*Tendencies in Danish Research Policy: Towards Bureaucracy and Market*). *Uddannelse* 9.
- Foss Hansen, H.  
1988 *Organisering og styring af forskning. En introduktion til forskning om forskning (Organization and Control of Research. An Introduction to the Field of Research on Research)*. Copenhagen: Nyt fra Samfundsvidenskaberne.
- Foss Hansen, H. and H.M. Jensen  
1985 "Undervisningens betydning for forskningen — illustreret ved forskeres selvoplevelse" (The Importance of Teaching for the Development of Research. Illustrated by Researchers' own experiences) in Egil Fivelsdal (ed.): *Nærbilleder af forskning. Organisationssociologiske studier (Close-ups of Research. Studies on Organizational Sociology)*. Copenhagen: Nyt fra Samfundsvidenskaberne.
- Foss Hansen, H. and H.M. Jensen  
1985b *Undervisning og forskning — et spændende samspil (Teaching and Research. An Exciting Relationship)* in *Uddannelse*, 1.
- Fridjónsdóttir, K.  
1983 *Vetenskap och Politik. En kundskapsociologisk studie (Science and Policy. A Study on the Sociology of Knowledge)*. Malmö: Akademilitteratur.
- Galtung, J.  
1977 *Methodology and Ideology, vol 1*. Copenhagen: Ejlers Forlag.
- Griffith, B. and N.C. Mullins  
1972 *Social Groups in Scientific Change*. *Science* 2 (September): 959—966.
- Hagstrom, W.  
1965 *The Scientific Community*. New York: Basic Books.
- Hernes, G.  
1978 "Makt, blandingsøkonomi og blandingsadministrasjon" (*Power, Mixed Economy and Mixed Administration*) in Gudmund Hernes (ed.): *Forhandlingsøkonomi og blandingsadministrasjon (Negotiation Economy and Mixed Administration)*. Oslo: Universitetsforlaget.
- Jensen, J.-J.  
1986 *Forskning og undervisning på universiteterne. Et samspil? (Research and Teaching at the Universities. An Interplay?)* Esbjerg: Sydjysk Universitetsforlag.
- Knorr-Cetina, K.D.  
1981 *The Manufacture of Knowledge*. Oxford: Pergamon Press.
- Krohn, W. and W. Schäfer  
1976 "The Origins and Structure of Agricultural Chemistry" in G. Lemaire, R. MacLeod, M. Mulkay and P. Weingart (eds.): *Perspectives on the Emergence of Scientific Disciplines*. Berlin and New York: Mouton Publishers.
- Kuhn, T.S.  
1970 *The Structures of Scientific Revolutions*. 2. ed. Chicago: University of Chicago Press.
- Larsen, B.  
1981 *Styringstænkning. Er ledelse mulig? (Thinking about Social Control. Is Management Possible?)*. Copenhagen: Nyt Nordisk Forlag.
- Latour, B. and St. Woolgar  
1979 *Laboratory Life. The Social Construction of Scientific Facts*. London: Sage Publications.
- Law, J.  
1973 "The Development of Specialities in Science. The Case of X-ray Protein Crystallography." *Science* 3: 275—303.
- March, J.G. and J.P. Olsen  
1976 *Ambiguity and Choice in Organizations*. Oslo: Universitetsforlaget.
- Merton, R. K.  
1957 "Priorities in Scientific Discovery. A Chapter in the Sociology of Science". *American Sociological Review* 22 (December): 635—659.
- Merton, R. K.  
1968 *Social Theory and Social Structure*. New York: The Free Press.
- Mintzberg, H.  
1983 *Structure in Fives. Designing Effective Organizations*. Englewood Cliffs, N.J.: Prentice-Hall.
- Mitroff, I.I.  
1974 "Norms and Counter-Norms in a Select Group of the Apollo Moon Scientists: A Case Study of the Ambivalence of Scientist". *American Sociological Review* 39 (August).
- Mulkay, M.  
1980 "Sociology of Science in the West, in Michael Mulkay and Vojin Milic (eds.)," *Current Sociology* 28, number 3.
- Mullins, N.C.  
1972 "The Development of a Scientific Speciality. The Phage Group and the Origins of Molecular Biology." *Minerva* 10: 51—82.
- Pedersen, M.M.  
1986 *The Irreversible Process of University "Democratization". The Danish Case. Occasional Papers, No. 25. Department of Public Finance and Policy*. Odense University.
- Pfetsch, F.R.  
1979 "The Finalization Debate in Germany: Some Comments and Explanations in Social Studies". *Science* 9: 115—124.

- Polyani, M.  
1962 "The Republic of Science. Its Political and Economic Theory." *Minerva* 1: 54—73.
- Premfors, R.  
1986 *Forskningsmiljön i högskolan — en kundskapsöversikt (Research Environment in the Colleges — An Outline of Knowledge)*. Report No. 36. Group for the Study of Higher Education and Research Policy. University of Stockholm.
- Price, D. J. de Solla  
1963 *Little Science, Big Science*. New York: Columbia University Press.
- Schäfer, W.  
1979 "Finalization in Perspective: Toward a Revolution in the Social Paradigm of Science." *Social Science Information* 18: 915—943.
- Stehr, N.  
1978 "The Ethos of Science Revisited: Social and Cognitive Norms." In: Jerry Gaston (ed.): *Sociology of Science*. Special issue of *Sociological Inquiry* 48, no. 3—4: 172—196.
- Storer, N. W.  
1966 *The Social System of Science*. New York: Rinehart and Winston.
- Whitley, R.  
1984 *The Intellectual and Social Organization of the Science*. Oxford: Clarendon Press.
- Zuckermann, H. A.  
1970 "Stratification in American Science." *Sociological Inquiry* 40, no. 2: 235—257.
- Zuckermann, H. A.  
1977 *Deviant Behaviour and Social Control in Science*. In Edward Sagarin (ed.): *Deviance and Social Change*. London: Sage.

Hanne Foss Hansen  
Centre for Public Organization and Management  
Copenhagen School of Economics and Social Science  
16 A, Blaagaardsgade  
DK-2200 Copenhagen N  
Denmark