Science, Technology & Human Values

<http://sth.sagepub.com/>

Has the Study of Philosophy at Dutch Universities Changed under Economic and Political Pressures?

Barend Van der Meulen and Loet Leydesdorff
Science Technology Human Values 1991 16: 288
DOI: 10.1177/016224399101600302

The online version of this article can be found at:
<http://sth.sagepub.com/content/16/3/288>

Published by:

<http://www.sagepublications.com>

On behalf of:

[Society for Social Studies of Science](#)

Additional services and information for *Science, Technology & Human Values* can be found at:

Email Alerts: <http://sth.sagepub.com/cgi/alerts>

Subscriptions: <http://sth.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations: <http://sth.sagepub.com/content/16/3/288.refs.html>

Has the Study of Philosophy at Dutch Universities Changed under Economic and Political Pressures?

Barend Van der Meulen
University of Twente

Loet Leydesdorff
University of Amsterdam

From 1980 until 1985, the Dutch Faculties of Philosophy went through a period of transition. First, in 1982 the national government introduced a new system of financing research at the universities. This was essentially based on the natural sciences and did not match philosophers' work organization. In 1983 a drastic reduction in the budget for philosophy was proposed within the framework of a policy of introducing savings by distributing tasks among the universities. Recently, a visiting committee reported on the weak and strong areas of Dutch philosophy and proposed a policy to strengthen Dutch philosophy. This study explores the effects of the institutional reorganizations on the study of philosophy at the faculties, using scientometric methods. In addition to presenting empirical results, some methodological questions concerning the application of scientometric methods to a field of the humanities will be discussed. The number of publications went up as funding was cut back, and different subfields made different kinds of changes in orientation. The results show the relevance of publication-based data in research evaluation.

Although the study of philosophy has been an important part of academic life ever since the new Dutch Republic established its university system in the late sixteenth and early seventeenth century (Poortman 1948), the institutionalization of a philosophy that was distinct from theology and philology emerged in the Netherlands only after World War II. In 1960 new legislation on higher education demanded the formation of a "Central Interfaculty" at

---

AUTHORS' NOTE: No order of seniority is implied by the order of our names. We want to thank Trudy van Asperen, for advice, and Hubert-Jan Albert and Annelie Roozen, for helping to collect the data.

Science, Technology, & Human Values, Vol. 16 No. 3, Summer 1991 288-321
© 1991 Sage Publications, Inc.

each university for the promotion of knowledge about and reflection on the "unity of science" (see Schavemaker 1985). Subsequently, the study of philosophy was organized within these faculties, with facilities for students from other faculties to combine their original studies with a major in philosophy.

During the 1960s and 1970s, the Central Interfaculties witnessed a period of undisturbed growth, mainly because of increasing numbers of students. Areas of scholarly interest were chosen by individual teachers, albeit in relation to student interests. This period of relative autonomy ended dramatically when in the late 1970s and early 1980s, the Dutch government launched a series of policy initiatives aimed at reorganizing university research into larger-scale programs to be judged by peer review ("the conditional finance system"; Second House of Parliament 1979-1980b) and at effecting structural economies by concentration and specialization among universities (Taakverdelingscommissie 1983). As a consequence, the Faculties of Philosophy went through a period of transition from 1980 to 1985 (see Maassen and van Vught 1989).

In this study, we use scientometric data and methods to investigate whether the drastic changes in economic and political climate for the study of philosophy at the Dutch universities had effects on what philosophers study. In its recent report, a Government Advisory (Visiting) Committee on Philosophy (Verkenningcommissie Wijsbegeerte 1987) pointedly refused to use such methods. We argue that scientometric analysis allowed us to broaden the scope of evaluation of scholarly performance beyond institutional parameters and even to assess with hindsight the (largely unintended) effects of national science policy.

In general, research evaluators accept that if one wants to measure output in terms of international standards, one should preferably compare "like with like" (see, among others, Martin and Irvine 1983). In our case, however, the policies that have been promoted by other European countries in order to economize on philosophical activities are similar to, but presumably in many respects also different from, the Dutch policy. The study of philosophy also varies in important respects among national cultures. Therefore, in a comparative analysis, we would not be comparing like with like, and from the results of such a study we would not be able to understand how increases or decreases in output would relate to the various factors involved.

In this study, we conceive of the process of reorganization and institutional shrinkage of Dutch philosophy departments as taking place in relation to several contextual developments. First, there is the policy process, which we will describe in some detail in the next section. Second, there is the develop-

ment of philosophy as a field of scholarly activity, which constitutes an important context for academic philosophers in providing them with standards and publication outlets and, hence, with opportunities for international professional recognition. Van Peursen (1980) has argued that philosophy in the Netherlands is strongly influenced by the interaction of Anglo-American, French, and German thought. This implies that Dutch philosophy is integrated in an international pattern of development on the cognitive level. Nevertheless, we can distinguish those publications that aim to address audiences at the national level and that are published in Dutch journals from those published abroad. We expect an analysis of this international context to add to our understanding to the extent that it enables us to explicate options for future developments. Therefore, we will also use this analysis to set out a possible policy on Dutch philosophy in our conclusions. Third, there is the underlying dimension of the social composition of the group of Dutch philosophers involved.

The National Science Policy Context

In 1983, as part of the policy to effect structural economies by concentration and specialization, the Dutch government proposed a budget reduction of 18% (Dfl. 6.0 million) for philosophy. The savings would be realized by retaining a four-year course in a mere three faculties — instead of the eight existing at that time — and by reducing the philosophy program at three other universities to three years, following an initial first year in another discipline.

At that time, only two of the yearly cycles of submission of programs to the new system of “conditional financing” for university research had been completed (Blume, Spaapen, and Prins 1985; Blume and Spaapen 1988). The aim of this new system of financing research was to organize the qualitatively good research into programs of at least five full-time equivalent faculty members (FTEs). It was also intended initially to reallocate financial resources between universities and faculties, depending on the amount of conditionally financed research as a percentage of the total amount of research in FTEs.

However, the demand to have programs of at least five FTEs, which was obviously science based, did not match the work organization of philosophers. Until then they had worked mainly alone and were not used to cooperating institutionally along programmatic lines. From the results of the first two cycles, it was already obvious that philosophy departments were not succeeding in meeting their quotas of conditionally funded research time.

These two circumstances—the threat of substantial budget cuts at the national level for scholarly work and education and the threat in the longer term of losing the possibility of scholarly work above and beyond that absolutely essential for teaching—mobilized the university staff involved to defend the interests of their profession.

Institutionally, resistance was organized at two places. First, the Royal Academy installed a committee, chaired by the well-known physicist H. Casimir, to develop a plan for the future of philosophy in the Netherlands. Aside from Casimir, the committee consisted of university professors of philosophy only. Second, from 1984 deliberate policies were developed among the faculties to enhance programs, which could be submitted for conditional finance. In the meantime, the requirement of five FTEs had also been relaxed to two FTEs.

In public debate, for example, in newspapers, some philosophers accused the minister of science and education of substantive intervention in the cognitive development of Dutch philosophy. The policy incentives would encourage some branches of philosophy more than others and thereby implicitly adopt a view that philosophy consists of several specialties, in contrast to those who advocated the integrating function of philosophy. Correspondingly, the debate was carried on between, on one side, those who thought of philosophy as mainly reflection on various sciences and, on the other side, those who pleaded for social philosophy and ethics. The Casimir committee managed to develop a compromise, which realized the required reduction in volume while maintaining the full scope of activities in “clusters” in universities at the regional level. Moreover, active lobbying and public debate resulted in a parliamentary resolution, which moderated government policy (Second House of Parliament 1983). However, although the ministry had to accept these results as the basis for its short-term policy, the proposed budget cuts were maintained. In addition, in 1986 the minister initiated a systematic evaluation of philosophy at the university by installing a visiting committee, which had to give long-term policy advice.

In its final report (Verkenningcommissie Wijsbegeerte 1987), this committee made a quality assessment of Dutch philosophy that was based on “the knowledge of the publications the members of the committee already had. If necessary, a part of the publications of the philosophers concerned were read.” It concluded that in general, “history of antique and medieval philosophy” and “logic, philosophy of science and philosophy of language” were practiced at a high-quality level in Dutch universities, while in the opinion of the committee, “modern philosophy,” “metaphysics,” and “ethics and social philosophy” were on the average “weak,” despite the fact that each

faculty sustained a group in the latter area. Consequently, the committee proposed to consolidate and reinforce the “strong” fields and to establish a new institute for the systematic study of modern philosophy.

What had started as a debate about what philosophy should be at the universities had now become an issue of strength and weakness in terms of quality. However, as noted above, the Visiting Committee (Verkenningcommissie Wijsbegeerte 1987) had explicitly rejected the use of scientometric data and methods for the assessment of performance with the argument that there is no agreement on what should count as philosophy nor on what should be understood by efficient government spending in this area and that hence, “such analysis would only lead to quasi-precision, given the reliability of the data.”¹

In our opinion it has been too easily assumed that it is impossible to open fruitful debate on the basis of independently generated scientometric data (see also Moed et al. 1985). In this article we show that scientometric data can give insight into actual developments and options for future developments.

The Use of Scientometrics in the Study of the Humanities

The issue of how to use scientometric methods and data in the humanities was raised very early in the development of the specialty by one of its founding fathers, Price (1970). He argued that the differences in sciences are reflected in differences in citation practices: “With a low (immediacy) index one has a humanistic type of metabolism in which the scholar has to digest all that has gone before, let it mature gently in the cellar of wisdom, and then distil forth new words of wisdom about the same sort of questions.”

Cole, Cole, and Dietrich (1978) criticized Price for overlooking the fact that in the humanities one is more dependent than in the natural sciences on a distinction between a reference and a citation: the concept *reference* should be reserved for authors whose writings are the subject of study, while one should use *citation* for instances of citation of another student of the same subject. However, these authors also showed empirically that even if such a distinction was maintained, the immediacy index is still substantially lower for the humanities (Cole, Cole, and Dietrich 1978).

Since then, our understanding of the process of citation in the natural sciences has become more sophisticated. We no longer think of citations unambiguously as pieces of a jig-saw puzzle that can be put in shorthand by a reference. In addition to references to results and methods developed and used by other authors, we increasingly think of citations as ways to relate

arguments and to weave a new knowledge claim into what has been called an evidential context (Pinch 1985; Amsterdamska and Leydesdorff 1989; Cozzens 1989). In light of this increasing attention to the scholarly character of scientific texts, Price's distinction seems one of degree, and not one of kind (Cole 1983; Cozzens 1985).

However, the relative importance of references as a wider category than citations is also reflected in the organization of bibliographic work in the humanities and is, therefore, available for empirical research. For example, the *Philosopher's Index* of the Philosophy Documentation Center at Bowling Green State University lists "named authors," a category that encompasses both cited authors and philosophers whose ideas are discussed. For the analysis of what philosophers study cognitively, the latter category seems comparable to title words and index terms, as descriptors of content, while citations, as listed in Institute for Scientific Information's (ISI's) *Arts and Humanities Citation Index*, may be usable as indicators of contemporary impact. We will use these various indicators in an exploratory way in this study.

Measurement techniques based on the co-occurrences of title words, keywords, and descriptors are dependent on codification of word usage in the sciences involved (Leydesdorff 1989; Kranakis and Leydesdorff 1989). Zuckerman and Merton (1973) related codification to the agreement among scientists within a discipline over criteria for assessing the importance of new problems, new data, and newly proposed solutions. They argued that codification decreases as we go from the natural sciences, through the social sciences, to the humanities.² More recently, Whitley (1984) proposed analyzing the intellectual and social organization of the sciences in terms of task uncertainties and mutual dependencies. A low degree of codification and a high degree of differentiation would lead in Whitley's typology to a so-called fragmented adhocracy, with correspondingly low functional and strategic dependence and a high technical and strategic uncertainty. Whitley (1984, 206) characterizes such systems as follows:

Fragmented adhocracies are fluid and weakly bounded systems of work organization and control with little stable internal differentiation and highly personal co-ordination processes. Research is rather divergent and idiosyncratic in these fields and limited in its interconnectedness.

Considering philosophy as a highly differentiated field composed of various traditions that do not necessarily communicate with each other, the fruitfulness of co-word analysis could be limited.

In addition to this cognitive differentiation, in the case of philosophy we may expect an external differentiation of "audiences," which may further

impede intellectual coherence and codification. As a mode of reflection on the sciences and on social developments, philosophy aims to contribute clarification to their development.³ Many philosophers, therefore, act primarily in relation to, or at least in communication with, these other discourses. Consequently, although the words used by philosophy may have a specific meaning in one context, the same word may have a rather different one in another. The effect of this external function of philosophical discourse, however, may be different in the case of philosophers who address scientific disciplines with questions about their foundations from what it is for philosophers who address general intellectual audiences about moral and social issues.

Even prior to problems related to the application of various scientometric indicators to philosophical publications, the issue of the inherent relation to external audiences in philosophy, and more generally in the humanities, raises the question of what should count as a contribution. Since the *Science Citation Index*, which has nowadays separate issues for the sciences, the social sciences, and the arts and humanities, primarily covers publications in international journals, one could argue that this would not be a useful indicator in the case of fields that also (or primarily) aim to contribute to aspects of national culture. The issue of varying degrees of "internationalization" merits attention, and its neglect is probably at the base of part of the intuitive resistance among students of the humanities against "being measured scientometrically," despite the long-standing bibliographic traditions in these areas.

Using publication and citation data of Dutch authors in five fields in the humanities and three in the social sciences, a recent study (Nederhof et al. 1989) showed that scholarly articles in journals were also the predominant outlet for published communication in these fields. But despite the fact that some of the Dutch journals were covered by the *Science Citation Index*, the local/international dimension had to be taken into account because of large variance on that dimension among the fields. In the case of some fields, internationally indexed data were not sufficient as a source for proper assessment of publication patterns, and a fortiori for impact measurement using citations.⁴ Nederhof et al. (1989) proposed to distinguish between contributions that aim at reporting scholarly work and contributions that aim at informing other audiences.

However, in the case of philosophy, such a distinction seems inadequate, since one of the major aims of much scholarly work is clarification for and enlightenment of other audiences. Rather, when assessing publication patterns or measuring impact, it is more appropriate to distinguish between

(international) scholarly communication and other functional arenas of philosophical discourse. Knowledge production is geared to more than one system of integration and control (cf. Whitley 1984).

As Hagendijk and Prins (1984) have argued in the case of sociology, "national subfields" may have dynamics of their own, which may or may not be linked to international developments. In the case of philosophy, we would like to extend that idea to the notion of various institutional forms of intellectual organization that exist side by side with the intellectual organization as such of the field. The different forums of integration and quality control may also influence one another, particularly when students in these areas have to legitimize their activity in terms of performance and quality. Performance and quality can be given a different meaning in the different perspectives, and under some circumstances the scientists involved may be able to "convert" credit from the one arena into the other.⁵

In the scientometric study of differentiated fields, one is in need of a perspective in which one can account for these different institutional contexts of the field. In a different context, Holzner, Dunn, and Shahidullah (1987) recently proposed to relate indicators to various functions the "knowledge system." In our opinion, this approach can also be generalized to our case: whenever the various functions of a knowledge system are highly differentiated, indicators are necessarily (but probably to different degrees) associated with the various functions one may discern. This conclusion emphasizes that the interpretation of indicators in terms of performance and quality is not available a priori but depends on subfields and audiences. The strength of scientometric analysis is not that it is an objective arbiter between competing claims to performance and quality but that it supplies us with a means to study more quantitatively the relations among the various dimensions of performance and quality.

Methods

Conceiving of knowledge production as related to various forms of control has methodological implications for the research design. As we noted at the end of the introduction, we conceive of the process at the Dutch departments described in this article as taking place in relation to the policy context, the international context, and the social composition of the group of Dutch philosophers.

In order to assess these developments, we compiled a data base of all publications by philosophers at eight Dutch faculties of philosophy during

1979 and 1980 (at the highest point of a period of sustained growth) and at one faculty for 1984 and 1985, after a few years of crisis and reorganization. Initially, to keep comparisons with the qualitative results of the visiting committee as tractable as possible, we requested access to the committee's data, but this request was turned down by faculty representatives, since they wanted control over "their own data." Most faculties, subsequently, gave us the data in the format that had been used for the committee, but in two cases (Nijmegen, Utrecht) we had to use publication lists as published in annual reports.⁶

All publications were categorized by author, university, field of research, and journal if applicable. Additionally, using indications in the annual reports, each publication could be distinguished as "scholarly" or "popularizing."⁷ The articles were also categorized by whether they were published in Dutch journals or abroad.

We used the categorization of the visiting committee to attribute each article to one of six fields of research:

1. history of philosophy;
2. metaphysics and epistemology;
3. anthropology;
4. ethics and social philosophy;
5. logic, philosophy of science, and philosophy of language; and
6. other.

Although this categorization seems rather crude, it matches with institutional structures at philosophy faculties in the Netherlands.

To indicate the development of Dutch philosophy as a "national subfield," we also used all publications in the Dutch language in the *Philosophers' Index* of the Philosophy Documentation Center at Bowling Green State University. This index is available on DIALOG. It not only lists the "named persons" for each article but also attributes professional descriptors to each of them. Again we used the 1979-80 versus the 1984-85 period. We analyzed named persons and descriptors on word patterns and co-occurrences and compared the results with a similar analysis of the titles in the data base of publications of the faculties of philosophy, cross-referenced by fields of research, as defined above.

We examined the possibility of indicating the development of philosophy at the international level using journal-journal citation measures, as previously developed by one of us for the natural sciences (Leydesdorff 1986, 1987; Leydesdorff and Van der Schaar 1987). Since ISI's *Arts and Humanities Index* does not have a journal package, we had to use the *Social Science*

Citation Index (SSCI) which lists philosophy journals from the perspective of their relevance for the social sciences, for this purpose. However, this amounted to 15 philosophy journals in 1979-80 and 18 journals in 1984-85. All these journals were used as entry journals for the construction of a graph using iteratively the 3 most important citing and cited journals. To compensate for the low numbers of citations, we added two years of citation data in each case. Parts of these graphs were analyzed using quantitative techniques as described in previous articles (Leydesdorff 1986).

For the third contextual variable, namely, the social composition of the community of publishing authors, we used as indicators the listings of faculty as published in the *International Directory of Philosophy and Philosophers* (1978-81, 1982-85, 1986-89).

Results

Analysis of the International Context

Of the 15 philosophy journals covered by the *SSCI* in 1980, 10 were also covered in 1985 (see Table 1).⁸ The degree of correspondence between the two lists gives a primary indication of a shift of relations among the journals involved.

The two extended graphs, constructed for 1980 and 1985, both consisted of several strong clusters of social science disciplines with weak connections to separate philosophy journals.⁹ Despite the rather loose relations between journals dealing with scientific specialties and disciplines, on one hand, and philosophy journals, on the other, in two areas the qualitative graphs indicated important changes in the network. Changes were concentrated in two sections of these graphs, that is, in the relations between law and ethics journals and in the relations between history and philosophy of science journals and sociology journals.

Relations among ethics and law journals. A graph based on journal-journal citation relations in 1980 indicated a strong cluster of law journals and a weak cluster of philosophy journals. Both clusters were connected only by the citation relation between the *Philosophy of Public Affairs* and the *Yale Law Journal* (see Figure 1 and Table 2). For 1985 the graph of law journals is still as strong as before, but now several citation relations with philosophy journals exist (see Figure 2). *Philosophy of Public Affairs*, *Ethics*, *Journal of Business Ethics*, and *Environmental Ethics*, each related to one law journal,

Table 1. Philosophy Journals Covered by the SSCI in 1980, 1985, or Both Years

1980	1985	<i>British Journal of the Philosophy of Science</i>
1980	1985	<i>Daedalus</i>
1980	1985	<i>Deutsche Zeitschrift für Philosophie</i>
	1985	<i>Environmental Ethics</i>
1980	1985	<i>Ethics</i>
	1985	<i>Folia Humanistica</i>
	1985	<i>Hastings Center Reports</i>
	1985	<i>Human Studies</i>
1980		<i>Inquiry</i>
1980		<i>International Philosophical Quarterly</i>
	1985	<i>Journal of Business Ethics</i>
1980	1985	<i>Journal of the History of Ideas</i>
	1985	<i>Journal of Medical Ethics</i>
	1985	<i>Journal of Medicine and Philosophy</i>
1980		<i>Journal of Thought</i>
	1985	<i>Law and Philosophy</i>
1980	1985	<i>Philosophy of Public Affairs</i>
1980	1985	<i>Philosophy of Science</i>
1980	1985	<i>Philosophy of Social Science</i>
1980		<i>Proceedings of the American Philosophical Society</i>
	1985	<i>Social Philosophy and Policy</i>
	1985	<i>Soviet Studies in Philosophy</i>
1980	1985	<i>Studies in the History & Philosophy of Science</i>
	1985	<i>Studies in Soviet Thought</i>
1980	1985	<i>Synthese</i>
1980		<i>Transactions of the American Philosophical Society</i>

are now located at the border of the law cluster. *Philosophy of Law*, not covered in 1980, is strongly related to the cluster. In addition *Philosophy of Public Affairs* and *Ethics*, together with other philosophy journals, form an independent weak cluster, while the *Journal of Business Ethics* and *Law and Philosophy* seem more isolated from the other philosophy journals.

While during the whole period the "law discipline" itself exhibited a stable journal structure, several philosophy journals dealing with ethical issues came into vogue.

Philosophy of science and related fields. The other section, in which we witnessed significant change over this period of five years, concerned philosophy of science and the related journals of sociology, history of science, and sociology of science (see Table 3).

Figure 1. Qualitative picture of the citation relations between philosophy journals and law journals, 1980.

SOURCE: SSC/ 1980.

NOTE: See Table 2 for list of journals corresponding to numbers.

In the 1979-80 period, the journals related to philosophy of science were divided into a group of social science journals, on one hand, and philosophy and history of science, on the other (see Figure 3). The first cluster contained

**Table 2. Journals of Citation Networks
between Philosophy and Law 1980 and 1985**

---

1. <i>Philosophy of Public Affairs</i>	23. <i>Energy Future</i>
2. <i>Yale Law Journal</i>	24. <i>Journal of Law and Society</i>
3. <i>Iowa Law Review</i>	25. <i>New Left Review</i>
4. <i>Harvard Law Review</i>	26. <i>Philosophical Books</i>
5. <i>Michigan Law Review</i>	27. <i>Environmental Ethics</i>
6. <i>Columbia Law Review</i>	28. <i>Harvard Environmental Law</i>
7. <i>Journal of Law Education</i>	29. <i>National Resource Journal</i>
8. <i>Vanderbilt Law Review</i>	30. <i>Ecological Law Quarterly</i>
9. <i>Georgetown Law Review</i>	31. <i>Stanford Law Review</i>
10. <i>Ethics</i>	32. <i>Inquiry</i>
11. <i>Philosophy</i>	33. <i>Managing Commons</i>
12. <i>Journal of Value and Inquiry</i>	35. <i>Law and Philosophy</i>
13. <i>A Theory of Justice*</i>	36. <i>Taking Rights Seriously*</i>
14. <i>Just and Unjust Wars*</i>	37. <i>Concept Laws</i>
15. <i>American Philosophical Quarterly</i>	38. <i>Georgetown Law Review</i>
16. <i>Monist</i>	39. <i>Cato Journal</i>
17. <i>Science</i>	40. <i>Journal of Business Ethics</i>
18. <i>Duke Law Journal</i>	41. <i>Academy of Management Review</i>
19. <i>California Law Review</i>	42. <i>Journalism Quarterly</i>
20. <i>Foreign Affairs</i>	43. <i>Wall Street Journal</i>
21. <i>Journal of Philosophy</i>	44. <i>Fortune</i>
22. <i>Social Philosophy and Policy</i>	45. <i>Harvard Business Review</i>

NOTE: The titles marked with an asterisk are book titles. The occurrence of books in these citation networks may illustrate the relative importance of books in the humanities. Authors of the books in this list are J. Rawls, *A Theory of Justice* (1972); M. Walzer, *Just and Unjust Wars* (1977); R. Dworkin, *Taking Rights Seriously* (1977).

both “pure sociology” journals and “sociology of science” journals. However, using factor analysis, we were not able to distinguish between the two groups as elements of the eigenstructure of the matrix, while the second cluster could be subdivided into a clear “philosophy of science” and “history of science” group. Three journals have no major loading on any of the factors.

In the 1984-85 period, the journal-journal citation relations changed considerably (see Figure 4). The sociology of science journals are now a separate factor, related to the history of science journals (which have been joined by *Daedalus*), while the cluster of sociology journals has grown apart. The other main clusters consist of philosophy of science journals, and two of the journals that previously were less strongly connected. These have now formed a group, which we might designate as “epistemology.”

In summary, at the level of journal structures the major change in this field has been external to philosophy of science, notably the growth of “science

Figure 2. Qualitative picture of the citation relations between philosophy journals and law journals, 1985.

SOURCE: SSC/ 1985.

NOTE: See Table 2 for list of journals corresponding to numbers.

Table 3. Journals of Philosophy of Science and Related Fields

---

<i>Philosophy of Science</i>
<i>Philosophy of Social Science</i>
<i>British Journal of the Philosophy of Science</i>
<i>Studies in the History and Philosophy of Science</i>
<i>Journal of the History of Ideas</i>
<i>Daedalus</i>
<i>Synthese</i>
<i>Annual Science</i>
<i>Isis</i>
<i>Common Cognition</i>
<i>Social Studies of Science</i>
<i>Archives of History of Exact Science</i>
<i>Scientometrics</i>
<i>American Journal of Sociology</i>
<i>Social Forces</i>
<i>American Social Review</i>
<i>Current Sociology</i>

---

studies" as a separate specialty, with important links to philosophy, sociology, and history of science. During the whole period of time, there were stable groups of philosophy and history of science journals, for which the *British Journal of Philosophy of Science* and *Isis*, respectively, can be seen as paradigmatic examples. Within the philosophy group, some differentiation seems to have developed between issues of philosophy of science and of epistemology.

Conclusions with respect to the international context. The journal-journal analysis revealed two important developments in the international context between 1979-80 and 1984-85. First, in the subfield of social philosophy and ethics, there was a notable increase in the relation between philosophy and law. Concerning the titles of journals entering the journal network, this increase is due especially to a growing interest in ethical questions. In the subfield of philosophy of science, philosophy of science proper had a quite stable position, but the related "studies of science" have grown into a specialty.

As we have argued it is not the purpose of this analysis of the international context to construct a standard for quality assessment. Instead, it provides us information about developments at the international level that constitute options for Dutch philosophy. We will use these conclusions in the last section of this article.

Figure 4. Relation between philosophy of science and related disciplines, 1984-85.

Analysis of the Research Output

Effects of budget cuts and conditional finance. Before we focus on the scholarly performance of the Dutch faculties in terms of publications, we have to raise the question of whether the manpower base of the faculties changed under the pressure of the budget cuts and reorganizations and if so, in what respect?

The *International Directory of Philosophy and Philosophers* provides up-to-date information about the staff composition of seven of the eight Dutch faculties of philosophy for 1978, 1982, and 1986. Only the information about the Catholic University of Brabant (Tilburg) was out-of-date. Comparing the listings, one is struck by the almost complete immobility. There were some changes in the composition of each faculty, but these were due primarily to the hiring of temporary staff to do Ph.D. projects. At the level of professors, associate professors, and assistant professors, the listings for the various dates are almost identical. In only 10 cases did a philosopher move from one faculty to another during these eight years.

In actual fact, the total research time of the faculties of philosophy, which can be calculated from the annual scientific reports of the universities, did not decrease over the period 1980-85, despite the noted budget cuts. At some faculties, especially in Utrecht, the budget cuts did affect the total research time, but this decrease was offset by the increases of research time at other faculties, especially at Groningen (see Figure 5).¹¹

As we noted, the initial requirement in the conditional finance system (CFS) that only programs of more than five FTEs could submit proposals was very much at odds with the traditional work organization in philosophy departments. Indeed, the faculties of philosophy did not succeed in organizing programs of that size. Of the 27 programs that were "conditionally financed" in 1985, the smallest had a size of only 0.2 FTE and the largest of 5.9. The mean size was 1.8.

Most of these programs were accepted in 1984 or later, when the faculties of philosophy seriously tried to organize enough research time within the new finance system. However, success was not equal at each faculty. In 1985 at three faculties (Catholic University of Nijmegen, University of Amsterdam, and the Free University of Amsterdam) more than 75% of total research time was organized into programs under the regime of the CFS, but for the faculty at Tilburg the percentage was only 16%. For the other faculties the percentage fluctuated around 50%.

If we analyze research time under the regime of the CFS in 1985 in terms of subfields of philosophy, we notice that history of philosophy and logic/

Figure 5. Total amount of research time per philosophy faculty, 1983 to 1986 (in full-time equivalents).

SOURCE: = *Scientific Annual Reports*.

NOTE: EUR = Erasmus University, Rotterdam; KUB = Catholic University, Brabant; KUN = Catholic University, Nijmegen; RUG = State University, Groningen; RUL = State University, Leiden; RUU = State University, Utrecht; UVA = University of Amsterdam; VUA = Free University Amsterdam.

philosophy of science/philosophy of language took the largest share (both about 30%). While ethics and social philosophy are as large as these two categories in terms of total research time, only 20% of research in this subfield had been approved under the CFS.

Figure 6. Number of publications per philosophy faculty, 1979-80 and 1984-85.
 NOTE: First bar indicates 1979-80; second bar indicates 1984-85. EUR = Erasmus University, Rotterdam; KUB = Catholic University, Brabant; KUN = Catholic University, Nijmegen; RUG = State University, Groningen; RUL = State University, Leiden; RUU = State University, Utrecht; UVA = University of Amsterdam; VUA = Free University Amsterdam.

Output per university. The most remarkable result in terms of performance measurement is the increase in the total number of articles, contributions to books, and monographs between the 1979-80 and the 1984-85 periods (see Figure 6). There was a decrease in the number of articles and contributions to books only at the faculty in Utrecht, and in books only at the Tilburg

faculty. Note that these two faculties were mentioned in the last section as, respectively, the one that suffered a decrease in research time and the one that did not perform well in terms of conditional finance.

However, raw data about numbers of publications do not teach us much (Moed et al. 1985). We have to gain more insight into the kinds of publications. In terms of ratios between articles, chapters in books, and monographs, we found (in agreement with Nederhof et al. 1989) that articles are the main form of publication. With a ratio between articles, contributions to books, and monographs of 7.3:2.7:1 and 6.6:3.4:1 for 1979-80 and 1984-85, respectively, the distribution of philosophy publications resembles that of social history and of Dutch literature.

If we cross-reference the articles in terms of international or national, we find that in 1979-80 only 20% of the articles were published in international journals. Between the two periods this percentage increased to almost 35%. During the same period, the percentage of scholarly as distinguished from popularizing articles (in national and international journals) increased from 25% to 40% because of the growth of scholarly articles in international journals (see Figure 7). More precise observation of these data teaches us that this increase in the total number of (scholarly) articles in international journals took place at each university, but the increase was most remarkable at the Erasmus University (Rotterdam), the Catholic University of Nijmegen, and the Universities of Groningen and Amsterdam.

Output per subfield. Categorizing the publications as to subfield, we also notice an increase all along the line. There was a decline only in the numbers of articles in ethics and social philosophy and of monographs in anthropology (see Figure 8). In 1984-85, the largest subfield in terms of research output had become logic/philosophy of science/philosophy of language, as compared with ethics and social philosophy in 1979-80. History of philosophy was third in both periods; anthropology and metaphysics had smaller numbers of scholarly output.

In terms of the number of (scholarly) articles in international journals, logic/philosophy of science/philosophy of language also outdistances the other fields of research, but now history of philosophy is also larger than ethics and social philosophy.

These figures suggest a significant difference in terms of scholarly orientation between logic/philosophy of science/philosophy of language and ethics and social philosophy. Corresponding to the difference in ideas about what philosophy should be, the former field of research has increasingly

Figure 7. Articles distinguished by kind of article, 1979-80 and 1984-85.

Figure 8. Number of publications per subfield, 1979-80 and 1984-85.

NOTE: First bar indicates 1979-80; second bar indicates 1984-85.

become oriented to the international level and the latter to the national level. Authors in the latter area also list popularizing publications (see Figure 9).

Conclusions with respect to research output. In summary, we may conclude that external pressure acted as an incentive to publish (see also Spaapen et al. 1988). However, there is no evidence that—as was feared by some—philosophers sought their salvation in qualitatively poorer articles. The

Figure 9. Articles distinguished by kind of article for two fields of research, 1984-85.

increase of articles in international scholarly journals and of more labor-intensive publication forms such as monographs points in the opposite direction.

Moreover, from these figures we cannot conclude that there seems to be any relation between the patterns of publications and the policies adopted by the various faculties to accommodate the budget cuts and new system of finance. In only two cases could we relate a decline in some categories of output to direct results of the policies.

However, the analysis with parameters in terms of subfields indicated more change than could be gained from the analysis with institutional parameters (in terms of universities). On one hand, the subfield logic/philosophy of science/philosophy of language has been successful in organizing its research and augmenting its international orientation in terms of publications. On the other hand, those who focus on ethical and social issues have been less successful in these terms, although they have also substantially increased their output in terms of publications.

Development of the "National Subfield"

Publications in Dutch. At the national level, there are five philosophy journals in which Dutch philosophers publish to a considerable extent. Of these five main philosophy journals, two, the *Algemeen Nederlands Tijdschrift voor Wijsbegeerte* (ANTW) and *Wijsgerig Perspectief*, publish articles from all faculties of philosophy, although the contribution of the Free University (Amsterdam) is relatively small.

In the 1979-80 period, *Kennis en Methode*, a journal for philosophy of the social sciences, was dominated by the faculty of Groningen. In the 1984-85 period, authors from Groningen still published most articles in *Kennis en Methode*, but they no longer outdistanced the other faculties to the same extent as in 1979-80. A similar relation existed between the *Tijdschrift voor Filosofie* and the Catholic University of Nijmegen. In the fifth journal, *Filosofie en Praktijk*, philosophers from the Erasmus University (Rotterdam) and the University of Utrecht were somewhat dominant in 1979-80, and in 1984-85 philosophers from the Erasmus University and the University of Amsterdam, but the link with particular faculties seems weaker in this case. On the average, the connection between journals and specific faculties seems to be weakened, although in 1984-85 most faculties still favored some journals over others.

The latter is particularly the case for the Free University of Amsterdam, which has a Calvinist character. While other faculties began to publish in

each other's journals more regularly, this university kept its own publication circuit. Philosophers from the Free University published mainly in *Philosophia Reformata*, and they were the only Dutch philosophers who did so. Although the existence of a specific publication circuit for a reformed university is not surprising in a field like philosophy, it was not expected that the separation would be so complete.

Classifying the articles in the Dutch language by field of research, the contribution of logic/philosophy of science/philosophy of language decreased notably during the period under consideration. As indicated above, in terms of international publications, this field of research has now become dominant. In both 1979-80 and 1984-85 the contribution of authors in the field of ethics and social philosophy to the Dutch journals is remarkably high and is diffused over the five journals. However, in 1984-85 *Filosofie en Praktijk* grew into a journal focusing on issues of social philosophy and ethics, in correspondence with the editors' objective of contributing to philosophical reflection on social developments (Van Asperen 1980). In 1979-80 *ANTW* was still dominated by logic/philosophy of science/philosophy of language, but this domination disappeared with the growing international orientation of this field of research. Only *Kennis en Methode*, the Dutch journal on philosophy of science, continued in both periods to publish almost equal numbers of articles of philosophers in logic/philosophy of science/philosophy of language, on one hand, and in ethics and social philosophy on the other. Over the same period *Wijserig Perspectief* developed into a journal dominated by history of philosophy. The contribution of metaphysics was negligible in both periods and the contribution of anthropology decreased dramatically.

In summary, the objective of the ministry's policy of stimulating further specialization among faculties seems to have led to a stronger integration among members of philosophy faculties at the national level. Philosophy journals in the Dutch language, which were previously based in specific faculties, have now become more related to national communities at the subfield level. One part of the community has, to a certain extent, turned away from the national level as a relevant audience for the publication of their results.

Descriptors and named persons in the Philosopher's Index. For 1979-80 and 1984-85 the *Philosopher's Index* lists 104 and 120 articles, respectively, published in *Tijdschrift voor Filosofie*, *Kennis en Methode*, and *ANTW*. On visual inspection the word patterns of named persons and descriptors reveal the same trends as the results presented in the former section. The names of

the philosophers of science mentioned in 1979-80, notably Popper and Kuhn (both among the three most mentioned philosophers in 1979-80) have almost disappeared in 1984-85. Moreover, the descriptors indicate a rise of social philosophy and ethics and a decline of science.

However, title words, descriptors, and named persons are widely scattered. More than 80% of the title words are used only once, and most words or descriptors used more than twice are at a very general level (e.g., *science*). Therefore, in this case, it does not seem technically productive to analyze intellectual organization in these terms (Leydesdorff 1989).

The named persons seem a somewhat better indicator. In addition to the noted disappearance of philosophy of science from the national arena, we note the increase in reference to Spinoza, probably because of the "Spinoza year" and the acceptance of a large CFS program on Spinoza at the Erasmus University of Rotterdam.

Conclusions with respect to the "national subfield." The analysis of philosophy journals published in the Dutch language provided us with more insight into differences in fields of research as well as into differences between universities. In the 1979-80 period the Dutch journals were linked more to specific faculties of philosophy, while in the 1984-85 period they were more organized along lines of subfield delineations. On average, substitution of tasks has been more journal specific than faculty specific. The policy aim of distribution of tasks among faculties seems to have failed. One faculty of philosophy alone has a very isolated position, related to the Calvinist character of the university.

The position of logic/philosophy of science/philosophy of language at the national subfield level has been weakened, while history of philosophy and ethics and social philosophy seem to have become better organized at this level as fields of research, taking into account the rise of national journals of their own.

The analysis of publications in the Dutch language using the *Philosopher's Index* did not add to our understanding of the dynamics at this level, based upon our institutionally generated data base. In accordance with the scattering of citation patterns at the international level, noted above, the cognitively more meaningful indicators like descriptors, title words, named persons, and so on, seem in the case of philosophy to be so scattered, at least at the national level, that it hardly made sense to analyze them in more detail. Our conclusions are therefore mainly based on the publication patterns and the more standard attributes that can be attached to publications as units of analysis, such as institutional affiliation, journal title, and so on. With hind-

sight we even think that we would not have been able to interpret the results from the former analysis, if we had not been informed about the results from the latter.

Conclusions

What had been voiced only as vague fears before the reorganizations of the philosophy faculties seemed to have become an established fact by the time the visiting committee wrote its final report (Verkenningcommissie Wijsbegeerte 1987), namely, that two types of philosophy are now institutionalized at Dutch universities, one more international and scholarly and one more local and socially oriented. The conclusions the visiting committee drew from this division, namely, that the one group is "strong" and the other "weak," is based on specific assumptions about the nature of philosophy. It is obvious that the committee did not take into account the differentiated character of philosophy. Therefore, the review of the committee showed a lack of understanding of the processes that had been going on in the reorganization and further differentiation of Dutch philosophy in the years before. *A fortiori*, they fashioned no idea about the effects of the economic and political pressures on the system and its performance in the various contexts.

First, it is clear from the data that despite, or maybe because of, the budget cuts, all groups of academic philosophers published more articles, more contributions to books, and more monographs in 1984-85 than in 1979-80. We may conclude that the budget cuts and probably also the introduction of the system of conditional finance, have led to increased attention being paid to scholarly work and the publication of results. Considering the increase in numbers of monographs and the growing numbers of articles in international scholarly journals, predictions that the attention for performance would lead to a publish-or-perish-culture, in which quantity would be more important than quality, seem also not to be warranted by our data.

What happened is something completely different from a differentiation into weak and strong. The economic and political pressures upon the system induced a reaction that is typical of what we referred to above as an extremely differentiated science or a fragmented adhocracy. The budget cuts imposed functional dependence upon Dutch philosophers as a community at the national level, without affecting (relatively high) task uncertainties or strategic dependencies. According to Whitley (1984) this is an inherently unstable configuration for a reputationally controlled work organization: in order to

survive as an academic activity one had either to adjust the other parameters at the national level or to change to the international level for reputational control, a solution that is, of course, dependent on constraints and possibilities. Obviously, the groups focusing on logic/philosophy of science/philosophy of language found their way to the international arena, and the groups focusing on ethics and social philosophy rearranged their respective national subfield by establishing their own journal (*Filosofie en Praktijk*) that enabled control of the reporting of task outcomes and therefore indirectly of research strategies. (In terms of Whitley's categorization, the two corresponding boxes are professional adhocracies and polycentric oligarchies, respectively.)

Both groups have been rather successful in their objectives. At one extreme, logic/philosophy of science/philosophy of language has managed to internationalize its publication forum to a considerable extent. At the other extreme, ethics and social philosophy has concentrated on organizing its activities at the national level and has, to a considerable extent, succeeded in the creation of that national forum. The two groups have played different hands, probably based on informal assessment of their own strengths and weaknesses, in a situation in which survival as an institutionalized academic activity was at stake. The third main field of research, history of philosophy, has a more stable position between the two other fields. On one hand, there is a (slight) increase in articles in international scholarly journals; on the other, *Wijzgerig Perspectief* has become more exclusively a history of philosophy journal.

In general, the intention of the structural budget cuts, to effect a distribution of tasks among faculties, has failed. A different specialization has taken place at the national level: the CFS, as a model of research organization more or less derived from the "hard sciences," has favored hard-science-oriented types of philosophy, although the others have also managed to get some programs funded. Therefore, the secondary policy objective of "internationalization" has been most successful. Internationalization has also returned the largest rewards, even to the point that the visiting committee used performance in this dimension as its prime measure for quality ranking.

Policy Implications

Our analysis has shown that the analytical framework in which one assesses performance and quality of Dutch philosophy has to take into account both the national and the international level of the integration of the

knowledge production and control system. Further, the scientometric analysis has provided us with a better understanding of the changing position of the various fields of philosophical research at those levels and the processes that have led to the indicated differences among the fields. This enables us to arrive at a more sophisticated understanding of what might be sensible future policies in relation to various problems in which the study of philosophy at Dutch universities is involved.

From a policy point of view, in small countries particularly, there are always good arguments in favor of internationalization of research because of the implied broadening of quality control. National scholarly debate may easily lead to provincialism, closed circles, and, eventually, patronage. On the other hand, in the case of philosophy, internationalization should not be an objective on its own but has to be related to the substance of debate. In other words, policy should stimulate philosophers to formulate their relevant international environment. Moreover, evaluations of philosophical studies should not aim solely at making a quality assessment but also, for example, at assessing developments at the international level that can be meaningful to Dutch philosophers. In this article, we have shown that such can be done using scientometric methods.

Considering our scientometric analysis of the international contexts, we suggest that internationalization in the field of ethics and social philosophy may be particularly attractive for philosophers dealing with problems relating to ethics and law. In order to manage a worthwhile internationalization, one should begin to analyze more carefully the content of contributions at the interface of legal sciences and philosophy, how this can contribute to the debate at the national level, and subsequently who in the Netherlands could participate in and contribute to that type of discussion. Dutch philosophical debate seems in need of studies of that kind.

With respect to national science policies, our study leads to the conclusion that concentration and distribution of tasks still remains to be organized. However, it does not seem possible to direct this process from the top level, given the amounts of resistance and immobility among the university staff involved. If the national government wants to rationalize an area like this, it should develop a policy by which lower levels are stimulated to articulate their own standards, not only within their own circles but also in serious debate with relative outsiders. In these past assessment rounds, in our opinion, although many philosophers were challenged and subsequently raised their levels of aspiration, the criteria for what would count as quality in the end were never seriously debated. Different groups developed their own standards, according to their own rules, without much reference to the

intellectual and social realities in their respective environments. The objective of rationalization was never handled as seriously by the administrators as the objective of economizing.

For future policies with respect to Dutch philosophy, decision makers should consider that current differences between fields of research can hardly be expressed in terms of quality. It is more important to analyze the origins of the differences and assess proposals for the various fields than to judge them in terms of quality. Anyhow, with respect to a policy, the choice seems to be either to accept these differences and weigh them against one another or to avoid delicate decisions and consequently develop separate policies for both kinds of philosophy.

Notes

1. Most of the earlier visiting committees had relied extensively on scientometric performance indicators, for signs of performance as well as for quality judgments. Only the Committee for Legal Sciences at the time refused to use, or at least to publish, such figures.

2. Other authors have reported that there is also a decrease from social science to the life sciences (Studer and Chubin 1980; Leydesdorff and Amsterdam 1990).

3. Of course, the conception of philosophy has been disputed by many philosophers themselves, and the uncertainty about it is at the core of the debate on Dutch philosophy, as we argue in this article. However, the task we give here is such that it catches most of the different opinions. For an encyclopedic discussion of these opinions, see Edwards (1972).

4. Nederhof et al. (1989) mention public administration, Dutch language, and Dutch literature as sciences not fit for assessment on the basis of ISI citation data.

5. Compare the concept of credibility circle in Latour and Woolgar (1979).

6. In the case in which both types of data were available, we checked for differences. These were only minor.

7. This latter category, including book reviews, publications written for students of other disciplines, and popularizing publications, corresponds more or less with the enlightenment (i.e., clarifactory) category in Nederhof et al. (1989). In the annual reports and several publication lists, this categorization was made by the philosophers themselves. We renounced such categorization if the distinction was not made in these lists.

8. *Synthese*, *Daedalus*, and *Studies in the History and Philosophy of Science* are covered but not classified as philosophy journals in 1985.

9. It is worthwhile to mention some more general characteristics of citation relations among philosophy journals. First, the philosophy journals appear to have strikingly different being-cited and citing patterns. They are cited by journals of disciplines like law, science studies, sociology, political theory, psychology, economics, and management. But mostly they themselves cite journals of the arts and humanities or nonscientific journals. The difference in citing and being-cited journals is consistent with the evaluating function of philosophy and suggests that the philosophy journals have specific positions at the margins of the scientific communication system.

Second, in the fields of the natural sciences and to a lesser extent in the social sciences, we are used to being able to distinguish discrete clusters of specialty journals citing each other heavily. In the case of philosophy, the journal-journal citation patterns seldom converge and when they do, clustering takes place within a specific other discipline. Philosophy journals are then in general not a strongly integrated part of such a cluster.

In addition, the citations to philosophy journals are spread among many more citing journals than citations to journals in other areas. From distributional considerations about bibliometric data such as Bradford's law (Bradford 1950), we may expect the dispersion of citations among citing journals to follow a logarithmic function. However, comparison with nuclear physics journals shows that the shape of this function of the philosophy journals in the 1980 entry set is strikingly different. Nuclear physics journals are mainly cited by just a few other journals, that is, 50% of the citations are given by only 1%-10% of the citing journals (source: Science Citation Indexes-Journal Citation Reports 1980). For philosophy this latter percentage is 15%-50%, depending on the journal.

11. On the basis of the data, it could be suggested that the budget cuts were not realized at all, but, considering Dutch university politics, it is more probable that the budget cuts were realized in teaching and administration.

References

- Amsterdamska, O., and L. Leydesdorff. 1989. Citations: Indicators of significance? *Scientometrics* 14:449-71.
- Blume, S. S., and J. B. Spaapen. 1988. External assessment and "conditional financing" of research in Dutch universities. *Minerva* 26:1-30.
- Blume, S. S., J. B. Spaapen, and A.A.M. Prins. 1985. *De externe beoordeling van wetenschappelijk onderzoek aan nederlandse universiteiten en hogescholen: Twee jaar voorwaardelijke financiering, een leerproces*. The Hague: Ministry of Science and Education.
- Bradford, S. C. 1950. *Documentation*. Washington, DC: Public Affairs.
- Cole, S. 1983. The hierarchy of the sciences? *American Journal of Sociology* 89:111-39.
- Cole, S., J. Cole, and J. Dietrich. 1978. Measuring the cognitive state of scientific disciplines. In *Toward a metric of science*, edited by Y. Elkana, J. Lederberg, R. K. Merton, A. Thackray, and H. Zuckerman, 209-51. New York: Wiley.
- Cozzens, S. E. 1985. Comparing the sciences: Citation context analysis of papers from neuropharmacology and the sociology of science. *Social Studies of Science* 15:127-53.
- . 1989. What do citations count? The rhetoric first model. *Scientometrics* 15:437-47.
- Edwards, P., ed. 1972. *The encyclopedia of philosophy*. New York: Macmillan.
- Hagendijk, R., and A.A.M. Prins. 1984. Referenties en revèrences: Onzekerheid, afhankelijkheid en citeernetwerken in de nederlandse sociologie. *Mens en Maatschappij* 59:226-50.
- Holzner, B., W. N. Dunn, and M. Shahidullah. 1987. An accounting scheme for designing science impact indicators: The knowledge system perspective. *Knowledge* 9:173-204.
- International Directory of Philosophy and Philosophers*. 1978-81. Bowling Green, KY: Philosophy Documentation Center.
- . 1982-85. Bowling Green, KY: Philosophy Documentation Center.
- . 1986-89. Bowling Green, KY: Philosophy Documentation Center.
- Kranakis, E., and L. Leydesdorff. 1989. Teletraffic conferences: Studying a field of engineering science. *Scientometrics* 15:563-91.

- Latour, B., and S. Woolgar. 1979. *Laboratory life*. Beverly Hills, CA: Sage.
- Leydesdorff, L. 1986. The development of frames of references. *Scientometrics* 9:103-25.
- . 1987. Various methods for the mapping of science. *Scientometrics* 11:201-320.
- . 1989. Words and co-words as indicators of intellectual organization. *Research Policy* 18: 209-23.
- Leydesdorff, L., and O. Amsterdamska. 1990. Dimensions of citation analysis. *Science, Technology, & Human Values* 15:305-35.
- Leydesdorff, L., and P. Van der Schaar. 1987. The use of scientometric methods for evaluating national research performance. *Science & Technology Studies* 5:22-31.
- Maassen, P.A.M., and F. A. van Vught. 1989. *Dutch higher education in transition: Policy issues in higher education in the Netherlands*. Culemborg: Lemma.
- Martin, B., and J. Irvine. 1983. Assessing basic research: Some partial indicators of scientific progress in radio astronomy. *Research Policy* 12:61-90.
- Moed, H. F., W.J.M. Burger, J. G. Frankfurt, and A.F.J. Van Raan. 1985. The use of bibliometric data for the measurement of research performance. *Research Policy* 14:131-49.
- Nederhof, A.J., R. A. Zwaan, R. E. Bruin, and P. J. Dekker. 1989. Assessing the usefulness of bibliometric indicators for the humanities and the social sciences: A comparative study. *Scientometrics* 15:423-36.
- Pinch, T. 1985. Towards an analysis of scientific observations: The externality and evidential significance of observational reports in physics. *Social Studies of Science* 15:3-36.
- Poortman, J. J. 1948. *Repertorium der Nederlandse Wijsbegeerte*. Amsterdam: Wereldbibliotheek.
- Price, D. J. de Solla. 1970. Citation measures of hard science, soft science, technology and nonscience. In *Communication among scientists and engineers*, edited by C. E. Nelson and D. Pollack, 3-22. Lexington, MA: Lexington Books.
- Schavemaker, C. 1985. *Politici over universiteit en filosofie, deelrapport voor de Academische Raad*. The Hague: Academische Raad.
- Second House of Parliament. 1979-1980a. *Beleidsnota Universitair Onderzoek*, 15.825, no. 1-2.
- . 1979-1980b. *Innovatienota*, 15.855, no. 1-2.
- . 1983. *Motie Beinema*, 17.649, no. 38.
- Spaapen, J. B., A.A.M. Prins, C.A.M. Vansuyt, and S. S. Blume, 1988. *Evaluatie van vijf jaar voorwaardelijke financiering: de moeizame relatie tussen beleid en onderzoek*. Zoetermeer: Ministry of Science and Education.
- Studer, K. E., and D. E. Chubin. 1980. *The cancer mission: Social contexts of biomedical research*. London: Sage.
- Taakverdelingscommissie. 1983. *Eindrapport Taakverdelingscommissie W. O.* The Hague: Ministry of Science and Education.
- Van Asperen, G. A. 1980. Editorial. *Filosofie en Praktijk* 1:3-6.
- Van Peursen, C. A. 1980. The Netherlands. In *Handbook of world philosophy: Contemporary development since 1945*, edited by J. R. Burr, 135-57. London: Aldwyck.
- Verkenningcommissie Wijsbegeerte. 1987. *Rapport van de Verkenningcommissie Wijsbegeerte*. Zoetermeer: Ministry of Science and Education.
- Whitley, R. D. 1984. *The intellectual and social organization of the sciences*. Oxford: Oxford University Press.
- Zuckerman, H., and R. K. Merton. 1973. Age, ageing and age-structures in science. In *The sociology of science: Theoretical and empirical investigations*, edited by N. W. Storer, 497-559. Chicago: University of Chicago Press.

Barend Van der Meulen is at the Centre for Studies on Science, Technology and Society of the University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands. He is doing research on judgments and control in science.

Loet Leydesdorff is Senior Lecturer in the Department of Science Dynamics, University of Amsterdam (Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands). His research focuses on the use of quantitative (scientometric) methods for science studies.