

**QANU Research Review
Science, Technology and
Innovation Studies
(STIS-UT)**

March 2009

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Foreword

This report follows the Standard Evaluation Protocol 2003-2009 for Public Research Organisations (SEP) that was developed by VSNU, KNAW and NWO. The purpose of this report is to present a reliable picture of the research activities submitted for this review and to give feedback on the research management and quality assurance.

The review committee was supported by QANU (Quality Assurance Netherlands Universities). QANU aims to ensure compliance with the SEP in all aspects and to produce independent assessment reports with peer review committees of international experts in the academic fields involved.

QANU wishes to thank the chairperson and members of the review committee for their participation in this assessment and for the dedication with which they carried out this task. We also thank the staff of the unit under review for their carefully prepared documentation and for their co-operation during the assessment.

Quality Assurance Netherlands Universities

Mr. Chris J. Peels
Director

Dr. Jan G.F. Veldhuis
Chairman of the board

Preface

This report describes the quality assessment of the research programme Science, Technology and Innovation Studies (STIS) of Twente University. The assessment covers the period 2000-2007 and was conducted according to the Standard Evaluation Protocol 2003-2009 for Public Research Organisations (SEP).

The quality assessment was carried out by a review committee consisting of one chair and four members with expertise in the relevant disciplines and in the professional field.

As chair of the Committee, I greatly appreciate the commitment, the expertise and the excellent cooperation of my colleagues. The Committee wants to thank all persons involved in the thorough preparation and support of the review.

Prof. Susan E. Cozzens
Chair of the Committee

1. The review committee and the review procedures

Scope of the assessment

The Review Committee members were asked to perform an assessment of the Science, Technology and Innovation Studies (STIS) research programme, as carried out by researchers in the Department of Science, Technology, Health and Policy Studies (STeHPS) of Twente University (UT). The assessment covers the research in the period of 2000-2007. This review does not include an assessment of the 'institute level'. The reason for this is that the Institutes involved (IGS, CTIT and MESA+) will be evaluated in a separate review process. One interview during the site visit was devoted to the 'management aspects', but only served as background information for the assessment of the research programme. In the period under review, the research programme consisted of three different research themes.

In accordance with the Standard Evaluation Protocol (SEP) 2003-2009 for Public Research Organisations, the Committee's tasks were to assess the quality of the group and the research programmes on the basis of information provided by the group and through interviews with the management and research leaders, and to advise how this quality might be improved.

Composition of the Committee

The composition of the Committee was as follows:

- Prof. Susan E. Cozzens, Georgia Institute of Technology, chair of the Committee
- Prof. Andrew Webster, University of York
- Prof. Trevor J. Pinch, Cornell University
- Prof. Alfred Nordmann, University of Darmstadt
- Ir. Paul 't Hoen, Advisory Council for ICT and Society.

A short curriculum vitae of each of the Committee members is included in Appendix A.

Roel Bennink of the Bureau of QANU (Quality Assurance Netherlands Universities) was appointed secretary to the Committee.

Independence

All members of the Committee signed a statement of independence to safeguard that they would assess the quality of the research programme in an unbiased and independent way. Any existing personal or professional relationships between Committee members and the programme under review were reported and discussed in the committee meeting. The Committee concluded that there were no unacceptable relations or dependencies and that there was no specific risk in terms of bias or undue influence.

Data provided to the Committee

The Committee has received detailed documentation consisting of the following parts:

1. Self-evaluation report of the research programme under review, *Dynamics and Governance of Science, Technology and Innovation*, which included the information required by the Standard Evaluation Protocol (SEP);
2. Copies of three key publications for each of the three themes in the programme.

Remarks about the data provided

Committee regretted that the self-assessment report did not include an analysis of the strength, weaknesses, opportunities and threats, neither at the level of the programme, nor at the level of the themes, as prescribed by SEP.

Procedures followed by the Committee

The review committee was asked to judge not only the performance of the research group but also the strategy and policy of the research group, particularly its profile as a group that aims to build bridges between the social and technical sciences and the University of Twente. This means that the evaluation of

the quality of research had to take into account the socio-economic impact and the political and policy relevancy of the research and its contributions to multi- and interdisciplinary research. More specifically, the review committee was asked to assess the quality and relevance of the research in relation to:

- the field of Science and Technology Studies
- the sciences and especially the engineering and health sciences
- public policy making.

The Committee proceeded according to the Standard Evaluation Protocol (SEP). Prior to the Committee meeting, each theme of the programme was assigned to two or three members of the Committee, who independently formulated a preliminary assessment. The final assessment is based on the documentation provided by the Programme, the key publications and the interviews with management and with the leaders of the themes. The site visit and interviews took place on December 7 & 8, 2008 at Twente University (see the schedule in Appendix C).

During the first Committee meeting on December 7, the Committee was briefed by QANU about research assessment according to the SEP. The next day, the Committee discussed the preliminary assessments. For each theme a number of comments and questions were decided upon. The Committee also agreed upon procedural matters and aspects of the assessment. After the interviews, the Committee discussed the scores and comments. The texts for the committee report were finalised through email exchanges. The final draft version was presented to the research group for factual corrections and comments. The final report was presented to the Board of Twente University; the Board formally accepted the report in a letter dated March 4, 2009 (S&C/385.493/pph).

The Committee used the rating system of the Standard Evaluation Protocol. The meaning of the scores is described in Appendix B.

2. Information at the Institutional level

Introduction

This review does not include an assessment of the ‘institute level’, i.e. the organisational setting, the research policy, funding, facilities, etc. The reason for this is that the Institutes that are involved, will be evaluated in a separate review process. The information provided here only serves as background information about the research programme.

The University of Twente (UT) has come to profile itself as a University of Technology that aims to study Technology in Context. The Science, Technology and Innovation Studies (STIS) Group is closely involved in stimulating this profile by building bridges between the technical and social sciences. This led to the integration of the STIS research programme into three different research institutes of the UT; two technical research institutes (the Institute for Telematics and Information Technology (CTIT) and the Institute for Nano-Technology (MESA+) and into the Institute of Governance Studies (IGS).

The staff of the STIS group covers the disciplines of sociology, history, political sciences, policy studies and science & technology studies. In 2005 the interdisciplinary collaboration was strengthened by merging three independent departments that altogether can be described as the STIS group and a then recently established research group into one new department: Science, Technology, Health and Policy Studies (STeHPS). The department staff teaches in a number of bachelor and master programmes and coordinates several master programmes.

The research programme focuses on the dynamics and governance of science, technology and innovation. The programme aims to cover the entire spectrum of the ‘life trajectory’ of techno-scientific developments, ranging from historical to forecast and policy studies. The research programme of 2000-2007 focussed on the societal construction of science and technology with explicit focus on cultural dimensions of technological change and innovation policy. The programme has three closely interrelated research themes, between and across which many collaborations have taken place:

- Theme 1: Science and Innovation Policies
- Theme 2: Technology Dynamics and Assessment
- Theme 3: History of Science, Technology and Society

Mission & Profile

The mission of the STIS group is to contribute to the analysis and understanding of the dynamics and governance of science, technology and innovation. The group has the basic assumption that science, technology and innovation should be considered as social processes. The STIS research programme takes the practices of scientists, engineers and policymakers involved in techno-scientific innovations as input for the development of methods.

Note on scope of the review

The current review only concerns the assessment of research and excludes teaching. Furthermore, the scope of this review is restricted to assessing the quality of research of the staff members that work for STIS and not of those that work on Health Sciences. Finally, the review does not include an assessment of the PhD-training programme. The majority of the PhD students receive their training from graduate schools that were positively evaluated in 2005.

The period covered by this evaluation exceeds the standard 6 year period. This is due to specific circumstances, such as a fire that destroyed the department in 2002, the move of the research group to another faculty and changes in the procedures of research evaluations in the Netherlands. According to the self-evaluation, the fire and the relocation may have affected the research output in the period under review.

Leadership

Formal responsibilities for research activities of the institutes rest with the scientific directors. Chairholders are responsible for the scientific direction of the research programmes linked to their chairs; they report to the scientific director of the institute under which a specific programme resides.

The leadership of the STIS research programme rotates between the chairholders. In October 2008 the leadership passed from Prof. Oudshoorn to Prof. Kuhlmann.

Research Strategy and Policy

The six institutes at the UT all focus on a multi-disciplinary area in which ‘strategic research orientations’ (SRO) are defined. These large scientific programmes have a programme director that is responsible for both the scientific coordination of the SRO and for responsibility to the director of the institutes involved. The STeHPS research group, which is mainly composed of the STIS group, participates in three, previously mentioned, research institutes.

Resources, Funding Policy and Facilities

As a matter of policy, all permanent academic staff have a dual assignment: teaching and research, while temporary academic staff (i.e. PhD students and postdocs) are usually restricted to a research assignment.

The programme has provided the following overview of the personnel resources, in full-time equivalents (fte) research time.

Source of funding	Fte	2001	2002	2003	2004	2005	2006	2007
University	PhD	n.a.	n.a.	3.40	3.93	1.96	0.72	0.68
	Other	n.a.	n.a.	4.28	4.88	5.71	5.46	3.76
Research Council	PhD	n.a.	n.a.	1.47	2.07	3.93	7.32	6.57
	Other	n.a.	n.a.	2.30	2.54	2.23	3.45	1.26
Other funding	PhD	n.a.	n.a.	1.06	1.60	1.47	0.8	1.17
	Other	n.a.	n.a.	0.58	0.76	1.13	0.4	1.00
Total		n.a.	n.a.	13.09	15.78	16.43	18.15	14.43

Note: 1 fulltime PhD student is equivalent to 0,8 fte research input and 1 fulltime postdoc is equivalent to 0,8 fte research input

The majority of the tenured staff is funded by the University. Non-tenured staff is mainly post-docs and PhD students, of which the majority is funded by research councils and other funding.

An overview is provided of the research input and source of funding of academic staff over the year 2007 (final year of the evaluation period).

Source of funding	University	Research Council	Other funding	Total
Research Input PhD	0.68	6.57	1.17	8.41
Research Input Others	3.76	1.26	1.00	6.02
Total research input	4.44	7.82	2.17	14.43
Research Input Phd €	26.246	250.231	39.551	€ 316.028
Research Input Others €	351.481	57.691	46.901	€ 456.073
Total Research Input €	377.728	307.922	86.452	€ 772.101

3. Overall assessment

The Committee found the STIS programme to be a high quality, effective programme. Over the period covered by the review, the programme made several major conceptual and empirical contributions that put Twente University among international leaders in the science studies/science policy area. The current research directions promise to make equal contributions in the coming period.

The societal relevance and impact of the group are particularly impressive. The academic quality of the work is at world standards, and STIS scholars have effectively created partnerships within the university, working relationships with a variety of government agencies in the Netherlands, and influence at European level. The idea of constructive technology assessment has global circulation. Graduates of the programme are moving into important positions as analysts and managers in research management and technology assessment in the Netherlands, and these successes are attracting high quality new doctoral students to the programme.

STIS has recently gone through a leadership transition. Arie Rip, who led the group ably for a number of years, retired in 2006. The group has moved to rotating chairmanship, with Nelly Oudshoorn taking that role first and Stefan Kuhlmann recently stepping in. The panel found that this leadership transition has been successful, although there are several areas (noted in later sections on themes) that are still undergoing intellectual transition. The group is effectively weaving together several traditional areas of inquiry (e.g., history, political science) with newer ones (notably science and technology studies) into an increasingly coherent interdisciplinary mix.

The group identified its small size as a strong point and the panel agreed. The focus on a few areas allows the group to choose research opportunities strategically and increase its rate of success in finding outside resources. They have an admirable record in that regard, the best in the Institute of Governance Studies. However, the drop in university resources between 2004 and 2007 (approximately 50% in FTE) is disturbing, and will certainly affect the group's productivity. Outside resources cannot fill in a gap of this size.

The many strengths of the group are tempered with some weaker areas. Collective leadership may not work over the long term for a unified identity for STIS. Several group members reported that the process of self-assessment for this review increased knowledge across the three research themes and created ideas and opportunities for strengthening interaction further. We note in particular that each of the theme leaders identified quite different peer programmes, suggesting that the audience for the programme as a whole is not yet clear to the group. The group has the most work to do in integrating Theme 3, including overcoming the structural fault line of PhD students in that theme being trained in a different national graduate programme. The panel felt that further self-examination would help the group, which needs to identify the particular niche it fills in terms of impact and focus efforts further in that direction.

Ratings

The panel rated quality of the programme as excellent (5). The research programmes of the themes all showed originality and the sample publications were of high quality. The global reputation of the group clearly puts it among international leaders.

The panel rated productivity as very good (4). Publications are appearing regularly, in appropriate places (some Dutch, some international). The rate is approximately what the panel expected for a competent group of scholars of this size.

The panel rated relevance as excellent (5). Especially in comparison with other scholars in the social sciences and humanities, and as noted above, this group has established strong partnerships with the sciences and engineering within the university, with Dutch funding and technology assessment agencies, and at the European level. In addition to policy-relevant activities, public outreach has been excellent, through channels such as the book series "Techniek in Nederland in de twintigste eeuw" and the development of a high school history of science programme.

The panel rated prospects for the group as very good (4). As noted above, the leadership transition has been successful and the research programme is vital. There are still dangers, however, that recent integration efforts will dissolve under the pull of rather disparate sets of colleagues outside the university and uneven funding opportunities. The group needs strong leadership to create the integration that will keep its reputation growing. The leadership during the period under review was unusually eclectic and open to synthesis of a variety of approaches. The new leadership team must create that environment as well or the group may dissolve into three (or more) small, largely unconnected areas of effort.

To summarise, the Committee rated *the programme as a whole* as follows:

	Quality	Productivity	Relevance	Viability
Science, Technology and Innovation Studies	5	4	5	4

The Committee rated *the themes of the programme* Science, Technology and Innovation Studies of Twente University (UT) as follows:

	Quality	Productivity	Relevance	Viability
Theme 1: Science and Innovation Policies	5	4	5	4
Theme 2: Technology Dynamics and Assessment	5	4/5	5	4
Theme 3: History of Science, Technology and Society	5	4	5	3

The detailed assessment per theme follows in the next section of this report.

Recommendations

1. *Full professor for Theme 3.* The panel finds it essential that each theme have leadership from a full professor, to provide doctoral training opportunities across the areas and create the even playing field on which integration can occur. Theme 3 currently lacks a full professor position. We recommend creating one as soon as possible, through promotion and/or appointment. This theme would also benefit from 1-2 more junior tenured positions.
2. *Feature all the strengths.* The panel found that several very strong parts of the programme were not featured as prominently as they could have been in the self-assessment, e.g. the research on user-technology dynamics or the activities in the domain of research evaluation. We recommend less humility in promoting such internationally recognized efforts.
3. *SWOT analysis.* The panel was surprised that STIS did not undertake the required analysis of strengths, weaknesses, opportunities, and threats. We recommend that they undertake that analysis as soon as possible and use the results to develop a more specific plan and a stronger focus on particular areas for impact.
4. *More systematic evaluation.* The panel notes that although the STIS group includes experts in research evaluation, the tools developed in the group were not applied in the self-assessment. In the opinion of the Committee, it would be worth considering (after the completion of the current review) if the evaluation tools developed in the group could be used systematically for monitoring their own research performance. The purpose would be to anticipate future developments and how to shape these with a clearer idea of their strengths and the risks they may face. We recommend that the group undertake this task and report to the Scientific Director of IGS by the end of 2009.

4. Assessments per theme

Theme 1:	Science and Innovation Policies		
Cluster leader:	Prof. dr. S. Kuhlmann		
Assessments:	Quality:	5	
	Productivity:	4	
	Relevance:	5	
	Viability:	4	

Short description

Research on 'Science and Innovation Policies' analyzes transformation processes of the research and innovation system, the role of governance and policy making in this transformation and the processes by which scientific knowledge contributes to policy making and innovation. During the period under review, this theme was guided by three main research lines:

1. Description of the (dys)functions of discursive and non-discursive practices in boundary work for dealing with different types of policy problems when dealing with relationships between scientific research performers and government.
2. Understanding of transformation processes as a result of the dynamics of science and technology and political interventions.
3. Instruments for science and innovation policies, especially evaluation, foresight and funding instruments.

Research plans include the strengthening of a governance perspective in particular in respect to exploring the lack of 'fit' between existing institutions of knowledge management (such as regulatory and other intermediary agencies) and emergent technologies. In addition, the research in this area provides steering through its work on 'transition management' and future political and policy developments. The institutional and geographical focus is also broadened to enable a 'post-national' framing of institutional governance and policy structures and processes, especially at a European level. Finally, there has been and remains a strong contribution within this Theme to policy (and institutional) evaluation and foresight studies for a range of national and international actors. Many of these issues were illustrated or anticipated in the body of the illustrative papers the Committee received prior to the visit.

Quality

The Committee recognised the national and international excellence of the work in this thematic area which has had a major impact on the field in terms of theorising science policy work in new ways and opening up the area to more complex analyses of the boundary work between scientific expertise and policy. It was also evident through the Committee's discussion with the three leads in this theme – Prof. Kuhlmann, Prof. Hoppe and Dr. Van der Meulen – that each is contributing in a major way to its further consolidation through both publication and future plans. A key aspect of the Twente group has been its preparedness to take up more normative issues. The use of the Constructive Technology Assessment (CTA) approach within the field of governance will enable an evidence-based STS to inform the policy domain through identifying ways in which different social and policy actors can build co-governance, and it is in relation to the latter, and the advisory role that the group plays, that more normative agendas can be built. The credibility the group with national (eg Rathenau) and international (eg the DFG and a range of EC advisory committees) academic and policy communities reflects the quality and impact of the research. The Committee considered that the group is one of the leading international centres in the area.

Productivity

Publications and dissertations records were thought to be solid and comparable with international centres elsewhere. Tenured and postdoc staff in this thematic area published 85 papers – including reports and commissioned pieces – over the 2000-7 period, with some papers in key journals such as *Research Policy*, *Scientometrics* and *Science and Public Policy*; in addition invitations to contribute to international Handbooks produced by major publishing houses indicates the good reputation of the group. Only two PhDs were

completed over the period of the review and of these two were granted and prepared within Twente, and most promoted by Prof. Rip.

Relevance

The relevance of the work is excellent as is shown in the wide range of advisory, editorial board, consultative and similar tasks undertaken by the academics working in this area. Internationally, the work is clearly regarded as being of great value, especially in respect to the evaluation, foresight and policy studies that are regularly commissioned. The link to the scientific/technical fields within Twente itself was good though still in its early stage of (institutional) development and so will need further consolidation in coming years.

Viability

The group has strong current leadership under Prof. Kuhlmann and was strengthened earlier by Prof. Hoppe's decision to join. Both are bringing an additional political science expertise to the theme. There are clearly strong links to Theme 2 core membership and areas of interest and this will help to bolster work in the area. There has been a high turnover of temporary postdocs over the period and a growing dependence on research funding from external agencies to sustain the activities of the group. The long-term viability of the theme will depend on sustaining similar levels of funding to refresh the research base.

Conclusion

Overall, the work undertaken within this Theme is of very high quality and well-regarded within the Netherlands and internationally. It has had a major impact on science and technology policy and provided a range of conceptual tools through which this can be improved. Productivity and viability are good. The continued renewal, through externally-funded postdocs, of new members that can provide the critical mass supporting this Theme is key and will ensure the group builds on its success to date.

Theme 2:	Technology Dynamics and Assessment		
Cluster leader:	Prof. dr. N.E.J. Oudshoorn		
Assessments:	Quality:	5	
	Productivity:	4/5	
	Relevance:	5	
	Viability:	4	

Short description

Within this theme the research aims to increase the understanding of the dynamics of processes of technological development and of the ways in which socio-technological change can be assessed. The research in this theme is organized around three research questions:

1. How can transitions of technological regimes be understood and assessed?
2. How can the dynamics of user-technology relations be understood?
3. How can new and emerging technologies be assessed?

Of these three questions, especially the latter feature prominently in plans for the future. The Committee found that plans are underway to make two hires in the third area of constructive technology assessment of particular new and emerging technologies.

This thematic area comprises rather distinct questions, and the graduate students in the Programme accordingly distinguish between "user-studies" and "technology assessment" – on the one hand, there is a strong research focus on the way in which users shape particular technologies; and on the other hand, there is a methodology of close engagement in ongoing processes of technology assessment, including assessment of rather large technological programmes like nanotechnology. By taking "CTA" as a powerful heuristic, the researchers in this thematic area aim to bridge this apparent difference of questions by expanding the focus on user groups in their cultural contexts and by expanding the CTA-methodology through the inclusion of cultural representations in the assessment-process.

Quality

Based on reputation, a survey of the self-assessment, and reading of various submitted manuscripts, the Committee readily judged the quality of research to be very high, indeed, at the forefront internationally. Especially the latter two strands are internationally recognised and clearly associated with researchers in Twente. The CTA-methodology belongs to the canon of technology assessment and has been adapted also in research governance processes world-wide (indicating an area of overlap with theme 1 on science and innovation policies). In recent years, nanotechnology served as one major focus of publications and dissertation-projects, establishing the STIS Programme as one of few international centres for high-quality sustained research on nanotechnology in society. Especially by way of the highly visible co-edited volume *Users Matter*, Prof. Oudshoorn and her immediate collaborators and doctoral students advanced and concretized long-standing discussions among sociologists and philosophers of technology regarding the "social shaping of technology" and the "co-construction of technology and society." Finally, the concept of "socio-technical scenarios" may be seen as a product of the interaction between the main strands of this thematic area: It expands the traditional scenario-methods of technology assessment by including cultural dimensions of meaning and ethical significance. Indeed, one of the major strengths and qualities of the Programme for the period under review is its ability to introduce powerful concepts which provided a focus or platform for international discussions and collaborations and which also served as a heuristic to orient the work within the Programme.

Productivity

The description of the quality of research already referred to its international recognition which, in turn, is based on productivity and effectiveness of communication. Counting foreign-language publications alone, the thematic area produced nearly 150 publications, about 2/3 of them peer-reviewed. This high-level of publication activity is maintained consistently and includes publications in leading journals like *Science and Culture*, *Science Technology and Human Values*, but also e.g. *Nature*. If this thematic area scores higher than the others in respect to productivity, however, this is due also to the larger number of doctorates awarded: 8

doctorates were prepared and awarded at Twente, another two prepared within Twente and the doctorate awarded elsewhere. This is a very strong record for a thematic area of this size.

Relevance

The concern with relevance is deeply inscribed into the research questions themselves. For both current major strands of research in this thematic area, relevance is not constructed only afterwards in an attempt to make one's findings matter. The involvement of users in shaping technologies leads immediately to design and an establishment of design-processes with user-participation. Constructive technology assessment is meant to reflect and influence research governance, foresight and assessment processes as they are practiced in the Netherlands and other countries. In both cases, testimony to this immediate relevance is reflected in research collaborations and funding sources. The Committee therefore rates relevance as excellent.

Viability

With currently one professor and one associate professor, this is a small but intellectually ambitious and energetic thematic area. It will be strengthened by adding another associate professor in the area of CTA. One sign of viability is that this thematic area attracts PhD students, and another, that there is a clear sense of what the future directions of research should be. While the notion of "constructive technology assessment" can serve as a common denominator and shared platform for the two thematic strands in this area and for the Programme at large, the Committee recommends that the significance of "user studies" is fully acknowledged as a visible and significant research agenda that can also stand on its own. Here is a potential area of tension or conflict that will need to be negotiated by the kind of genial and enlightened leadership that appears to be in place now.

Conclusion

Overall, the Committee is impressed by the high level of scholarship and clarity of focus within this relatively small thematic area of the STIS programme. The ratings reflect this. The balance between the fields of "user studies" and "CTA" needs to be carefully maintained; neither should subsume the other.

Theme 3:	History of Science, Technology and Society	
Cluster leader:	Dr. L. Roberts	
Assessments:	Quality:	5
	Productivity:	4
	Relevance:	5
	Viability:	3

Short description

This third theme is directed from the perspective of social, cultural, intellectual and institutional history towards broadening and deepening the insight in the long-term development of science, technology and society. Research within this theme is based on four leading research questions:

1. Understanding of the co-evaluation of technology and society, in particular in The Netherlands in the 19th and 20th centuries. Recently, the research question has shifted from the national context to the ‘becoming’ of Europe.
2. The challenge of interpreting the history of science as a cultural history, with science seen as an integrated element of more general cultural development.
3. Inquiry into the history through which modern science and technology came to be seen as recognizable and recognizably distinct realms of production.
4. The place of science and technology in global history during the period 1770-1830.

Quality

The quality of the research produced meets international standards of excellence and we had no hesitation in grading it a five. The award of a number of prizes to members of the groups further testifies to this excellence. We were struck that despite the small size of the group it carries out excellent work and plays a crucial role in adding historical depth and understanding to the other themes. The collaborations developed with leading historians elsewhere, whether the earlier joint work by Prof. Schot and Prof. Misa, or the later work by Dr. Roberts with Prof. Schaffer and Prof. Dear, show the importance of the group on the international stage. The group has imaginatively developed new historical understandings such as the role of technology in “European” identity and the new understanding of how invention and inquiry were both essential parts of the emerging modern world.

Productivity

The productivity is high, given the small size of the group. Its lack of ability to currently promote its own PhD students has no doubt affected its productivity in terms of dissertations.

Relevance

The societal relevance seems excellent. We noted the extraordinary relevance and excellent reception of Prof. Schot’s project on technology in the Netherlands in particular and the current efforts by Dr. Dijksterhuis to develop a special course about history of science and technology for high school teachers.

Its proposed new focus upon global history, the mediation and consumption of tourism and the cultural history of mathematics and chemistry seem to us to be excellent ways to extend the group’s interests and also maintain its tradition of viewing intellectual inquiry and practice as being intimately linked. We caution the group not to fall into the trap of too much focus upon specifically Dutch technology and science and to encourage it to continue to illuminate general historical themes of interest to scholars everywhere.

Viability

This theme is rather smaller in terms of personnel (two associate professors and one assistant professor) than the other two. With the departure of Prof. Schot in 2003 the theme currently lacks a full professor. The inability to promote its own PhD students and being dependent for such promotions on a professor (Prof. Cohen) who retired in 2000, is not a workable arrangement in the long term. A full professor is needed for the theme to reach its full potential and to maintain intellectual parity and balance in the context of the research group as a whole. We recommend that a full professorship is linked to the

programme as soon as possible, through promotion and/or appointment, and in addition one or two more junior positions be added to this group in order to maintain its future prospects and viability.

Conclusion

The viability of the group as it stands without a full professor is at the moment somewhat questionable. However, if a full professor and junior appointment or two were made, we feel this group has excellent prospects.

APPENDICES

Appendix A: Curricula vitae of the committee members

Susan E. Cozzens is Professor and Chair of the school of Public Policy at the Georgia Institute of Technology. She is the author of numerous articles in science policy and science and technology studies, and several books, including *Social Control and Multiple Discovery in Science: The Opiate Receptor Case* (SUNY Press, 1990), and *Theories of Science in Society* (co-editor with Thomas F. Gieryn; Indiana University Press, 1991). She is past editor of *Science, Technology, & Human Values*, the journal of the Society for Social Studies of Science. She has served as a consultant to numerous organizations, including the National Research Council, the Office of Science and Technology Policy, the National Science Foundation, and the National Institutes of Health. Before joining Georgia Tech, Dr. Cozzens was on the faculty of Rensselaer Polytechnic Institute. From 1995 through 1997, Dr. Cozzens was Director of the Office of Policy Support at the National Science Foundation. Dr. Cozzens received her Ph.D. from Columbia University in sociology and her bachelor's degree from Michigan State University.

Andrew Webster has a Personal Chair in Sociology at the University of York since 1999, and is head of the Department since April 2005. His main research interests relate to the sociology of science and technology, and in particular the social dynamics of bioscience, biomedicine and health informatics. His current work is focused on genetics, pharmacogenetics, stem cells and regenerative medicine where he is international coordinator of an EC funded project (REMEDiE) that examines the global developments in the field and the implications this has for European society and culture. His other research interests relate to science policy, intellectual property, regulation and evaluation of new technologies and he is Director of SATSU (Science and Technology Studies Unit, Department of Sociology, University of York). After completing his secondary education in Manchester, he spent two years at Boston College USA, before finishing his undergraduate studies (BA Social Sciences) at South Bank in London. His PhD was completed at the Department of Sociology under the supervision of Prof. Mike Mulkay exploring the relationship between traditional and modern medicine.

Trevor Pinch is Professor of Science & Technology Studies and Sociology and former chair of this department at Cornell University. He has a degree in physics from the Imperial College in London and a PhD in sociology from the University of Bath. He taught sociology at the University of York before moving to the USA. Together with Wiebe Bijker he started the movement known as Social Construction of Technology (SCOT) within the sociology of science. He is a significant contributor to the study of Sound culture, and his books include a major study of Robert Moog. His Areas of Interest are Sociology of Scientific Knowledge, Sociology of Technology, Sociology of Markets and Sociology of Music and Musical Instruments.

Alfred Nordmann is Professor of Philosophy and History of Science at Darmstadt Technical University, Germany. One of his main interests is the concept of representation as it develops from Kant and Lichtenberg via Heinrich Hertz and Ludwig Wittgenstein to contemporary debates about models and simulations in science. He also studies the formation of new scientific disciplines and their implicit conceptions of objective knowledge. In 2000, his attention turned to nanotechnology as a symptom of larger changes in the culture of science and the relation of science and society. He served as rapporteur of the European Commission's expert group *Converging Technologies – Shaping the Future of European Societies* (2004).

Paul 't Hoen is chairman of the Advisory Council of ICTRegie, the Netherlands ICT Research and Innovation Authority. He has held management positions at KPN, Vision Networks and Lucent Technologies. In the past he has held board-of-trustees memberships in the Rathenau Institute and in the Netherlands Study Centre for Technology Trends (STT). He chairs Kennisnet, the Dutch school network organisation and Holst Centre, a micro-electronics development laboratory in Eindhoven. He serves in several Advisory Boards and Committees, and as non-executive board member of ICT-related companies.

Appendix B: Explanation of the SEP-scores

<i>Excellent (5)</i>	Work is at the forefront internationally and will most likely have an important and substantial impact in the field. Group is considered an international leader.
<i>Very Good (4)</i>	Work is internationally competitive and is expected to make a significant contribution; nationally speaking at the forefront in the field. Group is considered international player, national leader.
<i>Good (3)</i>	Work is competitive at the national level and will probably make a valuable contribution in the international field. Group is considered internationally visible and a national player.
<i>Satisfactory (2)</i>	Work that is solid but not exciting, will add to our understanding and is in principle worthy of support. It is considered of less priority than work in the above categories. Group is nationally visible.
<i>Unsatisfactory (1)</i>	Work that is neither solid nor exciting, flawed in the scientific and or technical approach, repetitions of other work, etc. Work not worthy of pursuing.

Quality is to be seen as a measure of excellence and excitement. It refers to the eminence of a group's research activities, its abilities to perform at the highest level and its achievements in the international scientific community. It rests on the proficiency and rigour of research concepts and conduct; it shows in the success of the group at the forefront of scientific development.

Productivity refers to the total output of the group; that is, the variegated ways in which results of research and knowledge development are publicised. The output needs to be reviewed in relation to the input in terms of human resources.

Relevance is a criterion that covers both the scientific and the technical and socio-economic impact of the work. Here in particular research choices are assessed in relation to developments in the international scientific community or, in the case of technical and socio-economic impact, in relation to important developments or questions in society at large.

Vitality and feasibility. This dual criterion refers to the internal and external dynamics of the group in relation to the choices made and the success rate of projects. On the one hand, this criterion measures the flexibility of a group, which appears in its ability to close research lines that have no future and to initiate new venture projects. On the other hand, it measures the capacity of the management to run projects in a professional way. Assessment of policy decisions is at stake, as well as assessment of project management, including cost-benefit analysis.

Appendix C: Schedule of the site-visit

Sunday December 7, 2008

18:00 hrs	Hotel	short committee meeting: introduction to Standard Evaluation Protocol (SEP)
19:00 hrs	Dinner for Committee	

Monday December 8, 2008

9:00-10:00	Committee meeting	- discussion of preliminary assessments - preparing questions for the interviews
10:00-11:00	Meeting with the management: organisational setting, research management (short presentation followed by interview)	Topics: 1. Leadership 2. Mission and goals 3. Strategy and policy 4. Adequacy of the resources 5. Funding policies 6. Academic reputation of the institute 7. Societal relevance of the institute 8. Balance of the strengths and weaknesses of the institute
11:00-12:00	Sub-programme 1: Science and Innovation Policies. Cluster leader Prof. dr. Stefan Kuhlmann	Short presentation, followed by interview. Topics to be evaluated: Quality, Relevance, Productivity, Viability
12:00-13:00	Lunch	
13:00-14:00	Sub-programme 2: Technology Dynamics and Assessment. Cluster leader Prof. dr. Nelly Oudshoorn	Short presentation, followed by interview. Topics to be evaluated: Quality, Relevance, Productivity, Viability
14:00-15:00	Sub-programme 3: History of Science, Technology and Society. Cluster leader Dr. Lissa Roberts	Short presentation, followed by interview. Topics to be evaluated: Quality, Relevance, Productivity, Viability
15:00- 16:00	PhD-students (group interview)	<ul style="list-style-type: none"> • their research projects • their supervision
16:00-17:00	PhD-poster session; drinks and informal interaction with staff	
17:00-17:30	Committee meeting with scientific director IGS, prof. dr. J.J.A. Thomassen	
17:30-19:30	Committee meeting	conclusions and scores; task division towards report
19:30	Dinner for Committee	