The European guide to science, technology, and innovation studies
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The European guide to science, technology, and innovation studies

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How to use this guide

This is the first European guide to science, technology, and innovation (STI) studies. It aims to facilitate public access to these relatively young specialties of academic and strategic research. STI studies study the development of scientific knowledge, the process of technology creation, and the way these interact to innovate the economy and society as a whole. Because of this, the way they formulate the important questions about future social and economic developments, and the answers they have provisionally given, are relevant to a large number of people. Yet, many people who might profit from the knowledge developed in STI studies are unaware of these valuable sources. This is the main reason this guide has been written.

The results have also surprised the authors. This guide comprises more institutions than expected, and these are also more diverse than foreseen. Apparently, European society has become so complex that nobody has a clear overview. For ex-
ample, academic institutions no longer have the monopoly on knowledge creation. The increasing specialization in science has moreover made it virtually impossible to know one’s intellectual neighbours. On top of this, the guide ties together three different intellectual traditions: the sociology of science, the history of technology, and evolutionary economics. As a result, this guide brings together centres and institutions that never were on one podium before.

In general terms, the guide should be useful to anyone interested in knowledge creation, technology development, or innovation. The guide is especially meant for:

- students who wish to complement their education in one of the sciences, social sciences, or humanities with one or more courses in STI studies,
- journalists, public relations experts, or communication specialists who are confronted in their daily practice with the complex issues arising out of socio-technical innovation,
- teachers and lecturers in secondary and tertiary education who either wish to update their knowledge about science, technology, or innovation, or who wish to acquire new teaching skills in these areas,
- managers and decision makers in the private sector who need to develop knowledge based strategies, or face the
task of managing technology development or innovation processes, and therefore wish to update their capabilities,

- policy makers in the public sector who are confronted by the complexities of policy development and risk management in European technological culture, and therefore wish to refresh their window on the world.

The guide consists of three chapters:

1. The first chapter (page 1) gives a general introduction to the topics in STI studies. This should give the reader a quick overview and a bit of the flavour of the field. The second part of this chapter is divided in different sections meant for the different target audiences:

   - students (page 9),
   - communicators (page 11),
   - teachers (page 14),
   - managers (page 16),
   - decision makers (page 18).

2. The second chapter (page 24) is the main body of the guide, and gives practical information about the institutions, arranged on a per country basis. The information is based on documentation provided by the institu-
tions themselves. The first type of entries give the institutional address, phone numbers, and WWW and Email addresses; the second type of entries describe the general profile of the institution; and the third type of entries give detailed course information.

3. The third chapter (page 441) gives a topical entry to the STI studies in this guide. To give the reader a feel of the different types of approach in the STI centres in Europe, the chapter provides a tentative overview of the most important topics, without pretending to be complete. In each topical section, one project is described in more detail. This should give the reader more in-depth information than would be possible by a listing of all projects relevant to the topic. Yet, it often means a rather arbitrary choice among many equally interesting projects. Therefore, each section is ended by a index of European STI centres which are actively engaged with the topic involved. Effectively, this third chapter is a topical index to practical information in the guide.

Taken together, the three chapters should facilitate searching through this guide to European STI centres both an a per country basis, and per topical interest. If one is mostly interested in studying in a certain region, chapter 2 can be used as the main entry into the guide. If on the contrary a certain topic is
the perspective regardless of where the STI centres are located, chapter 3 is the best starting point.

As will be clear upon reading, the information about the different institutions is very diverse. This is not a coincidence, nor only a practical matter. To be sure, the fact that this guide is the first of its kind certainly contributes to a rather varying format of presentation. But more important is the nature of science, technology, and innovation studies. It is a quite heterogeneous field of studies, coming from diverse academic and policy related traditions. The object of study is moreover itself heterogeneous, due to the complex nature of present-day European society. We have chosen not to try to reduce this variety for the sake of a more coherent presentation. We think on the contrary that the variety in the way the institutions are represented may itself be an additional source of relevant and useful information.

Practical information such as telephone numbers and course data tend to have a high turnover rate. This is the reason this guide has been published both in printed form and as a World Wide Web document. The WWW-version contains recently updated information. This is the first time a guide like this on STI studies has been published. Although we have done our utmost best to collect as much information as possible, we are certain that some institutions may have been missed. This is, unfortunately, inevitable in a first-time experiment. We are however eager to update the available information as accurately as possible. If you have information which might be included in
the guide, please write to: Paul Wouters, Science and Technology Dynamics, University of Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, the Netherlands.
Chapter 1

Why STI? Introducing new perspectives on science, technology, and innovation

1.1 Participating in the future

How will we live and learn in the years to come? The future is being shaped today, and yet it is highly uncertain — the outcome of complex interactions between processes that are sometimes difficult to fathom. This inherently indeterminate char-
CHAPTER 1. WHY STI?

acter of the near future often seems to create or strengthen a certain feeling of disempowerment. The pace of social and technological innovation, and the way they are represented in the media (page 495) and in public opinion, moreover threaten to make the individual citizen gasp for breath. European citizens are, however, far from powerless and indeed quite capable of influencing the future (page 456). The processes shaping the future today are prone to interventions by individual citizens, firms, social movements, knowledge producers and governments, because of the very same uncertainties.

As is well known, science and technology play a dominant role in the innovation processes in Europe. So much so, that they are often awe-inspiring. New inventions and insights seem to bombard the public on a daily basis, creating the feeling of countless opportunities on the one hand, and of a constant threat to present values on the other. In the last couple of decades, this has created a novel need of “knowledge about knowledge (page 508)”. How is knowledge actually produced by scientific researchers? What are the intricate details of the creation of new technologies? And what is the nature of the innovation processes that determine the distribution of wealth and jobs (page 477)? These questions are the area of the studies in this guide. This guide aims to make a relatively new set of tools available, tools which may serve to co-shape the future.

Science, technology, and innovation (STI) studies provide, each in their own way, a new window on how society is be-
1.2. **LIFELONG LEARNING**

...ing structured and renewed. By critically researching the pertinent questions brought up by actual scientific and technological developments, these studies give a "backstage perspective" on society. If science and technology sometimes seem to open Pandora's box, STI studies try to open up the black boxes of scientific creation, technological invention, and wealth creation.

### 1.2 Lifelong learning

As already mentioned, knowledge has become crucial in present-day European society. Whether based on scientific research or on practical experience, it has become the major source of social and technological innovation. In this sense, we live in a knowledge society. This holds especially for Europe where reshaping the political and economic landscape in the post-Cold War era has gone hand in hand with imaginative, and sometimes disconcerting, leaps in scientific and technological areas. The European continent faces exciting challenges while it approaches the 21st century: improving the quality of life (page 480), creating an information society (page 443) in which the user truly is central, preventing and limiting processes of social exclusion, decreasing the high rates of unemployment (page 477), ending the systematic exploitation of one region or part of the world by the other, promoting competitive and sustainable economic growth, and preserving scarce and
endangered natural resources (page 485).

These challenges provide for opportunities on the one hand and create risks on the other, both for the individual and for society at large. Making use of the opportunities, and creating new ones, while managing the risks as much as possible, requires up-to-date knowledge of the processes involved. The more society has become knowledge-intensive, the more people function in knowledge-intensive contexts. Whether one is a student, an entrepreneur, a journalist, a decisionmaker or a teacher, one needs to update one's skills regularly. Lifelong learning is part of daily life: one can nowadays hardly draw a clear boundary between working and learning.

While this urge to constantly re-learn new skills is the result of an intricate complex of causes, one of the main driving forces is related to the explosive development of the natural and social sciences together with revolutionary new technologies. The link between science and technology has intensified itself in both directions. A host of natural and social scientific specialties have become more dependent on advanced technology, especially communication, information, simulation and measurement technologies. At the same time, technological and social innovation depends on the convergence of more diverse scientific specialties than before, while the existing social and cultural values, relationships and resources are profoundly shaping it. This explains why the challenge to acquire the most up-to-date skills (including the capacity to handle a vast area of
very diverse information resources) is especially acute with respect to understanding, contributing to, or managing scientific and technological innovation. This guide aims to facilitate these learning processes by making the varied European landscape of science, technology, and innovation (STI) studies accessible to prospective new students and the lay audience.

1.3 Innovation and tradition

The statement that European society has evolved into a technological culture (page 450), in which man-made innovation creates new opportunities as well as risks, is not just a statement. It is also a condensation of insights generated by scholars active in science, technology, and innovation studies in Europe.

Scientific research has been at the heart of European culture from the very beginning. The scientific revolutions in the seventeenth century shaped European scholarship, the enlightenment with its popularization of science and technology in the eighteenth century forged strong ties between science, technology, and culture, and the nineteenth century created the university as we now know it. The creation and further development of Darwinian evolution theory and the ground-breaking conceptual shifts in the fundamental concepts of time and space in the latter part of the nineteenth and the first part of the twentieth century have fundamentally changed our worldview and self-
perception.

Yet, the years since World War II have brought an even more intense relationship between science, technology, and social and economic innovation. European culture has effectively changed into a technological culture. Not only do technical devices and products play a large role in daily life, technology has moreover created a fundamentally novel cultural space in which we all live. Culture and technology shape one another in an intimate symbiotic dance. This creates new avenues for the future and new ethical and political dilemmas. It even reformulates what social relationships, politics, ethics, and economics are about. Previously non-existing phenomena like cyborgs and man-machine hybrids, xenotransplants, virtual companies, cyber-entertainment and genetically engineered life forms redefine how we want to live and what it means to be human and humane.

This acceleration in European societal evolution has created novel questions: how do science, technology, and innovation actually interact? In what way does society renew itself on the fly? How can these processes be managed and steered? And how can one make use of them? An important aspect is the very nature of innovation itself. Social and technological innovation is accompanied by a seductive rhetoric of permanent progress, creating the feeling that if one does not constantly renew oneself, one is hopelessly backward. Yet, tradition plays as important a role in shaping the future as the aforementioned
1.3 OPENING UP

changes do. Not everything moves fast. History counts, especially in Europe. It is not so much a matter of one-sidedly opting for progress as to use the tensions between innovation and tradition to increase the quality of future society.

1.4 Opening up science, technology, and innovation

Science, technology, and innovation studies address these questions in a variety of ways for a host of different audiences. By this, their scientific endeavour may have developed a strategic position in understanding and influencing the future. It is a relatively young enterprise, the oldest centres just celebrated their thirtieth anniversary. Perhaps one of its strongest points is its multi- and interdisciplinary character. Born partly out of concern about the consequences of the natural sciences for society, and partly out of a critique of the blind spot of traditional economic and social sciences with respect to innovation and technology, the fields of science, technology, and innovation studies have attracted people from a large number of disciplines. The diverse communities of science and innovation students comprise physicists, philosophers, medical researchers, engineers, chemists, sociologists, anthropologists, linguists, mathematicians, historians, biologists, communications specialists as well as students of popular culture. Virtually all centres in this guide
CHAPTER 1. WHY STI?

attest to this multifaceted atmosphere.

Not only have STI studies attracted scholars from a variety of disciplinary backgrounds, the landscape described in this guide is not homogenous itself. Many centres have never before been mentioned together as part of a common enterprise. STI studies do not form one discipline or closely related specialties. What you will see is more an intricate web of partly overlapping networks with fuzzy boundaries, some densely populated and some of them sparse. Commonly, three different traditions are distinguished (although every way of carving up the territory is by definition arbitrary): social studies of science and technology, innovation studies, and research policy studies. Within the first area, technology studies stand apart as a distinctive blend of the history and sociology of technology. Each tradition has created its own way of framing the problems, research methods, favourite literature, heroes and foes. Science, technology and innovation can apparently be opened up in diverse ways.

Yet, the studies in this guide have acquired common identities as well. Of course, nowadays identities are no solid cores but fluid distinctions, and this certainly holds for science, technology, and innovation studies. This does not make the question of identity less important, though. The "personality" of the studies in this guide resides in their difference from more traditional ways to study science and technology. Taken together, they have created exciting new perspectives on the process of scientific knowledge production, technological develop-
1.5 STUDYING STI

Science, technology, and innovation studies often combine knowledge from the natural and technical sciences with social scientific expertise and facts and wisdom from the humanities. The much-regretted divide in culture between the scientific and the culturally oriented is in STI studies non-existent. This has created fertile ground for breaking away from vestigial disciplinary perspectives on the world. STI studies draw upon history, sociology, economics, and philosophy, yet they differ markedly from the more traditional ways of telling stories about the world.

In writing the history of technology, historians and sociologists of technology have strongly influenced one another. In studying large-scale innovations like the communication system as well as small-scale inventions like the bicycle, the black box of technological innovation (page 499) has been opened. Technology has come to the fore as a social and cultural phenomenon whereas what counts as the social is strongly shaped
by the objects surrounding humans. In innovation studies, on the other hand, it is not the recreation of historical developments that is central but grappling with the present and near future. Historical methods and case studies are also part of this, but the focus is on today more than on yesterday. In contrast to traditional perspectives in economics, innovation studies moreover focus on states far from equilibrium and on newly emerging phenomena (page 459) related to technological innovation. This also provides a fresh perspective on the economics of knowledge: how does knowledge function as a commodity?

The traditional social sciences often still have a blind spot with respect to the emergence of technology and the natural sciences as new social, and sometimes seemingly antisocial, forces. By concentrating on science and technology, the studies in this guide not only fill up this lacuna, but also provide a new perspective on the question of social order as such. In other words, not only do they deliver a large amount of empirical material on present-day social evolution, they also reformulate the classical sociological, indeed foundational, questions. One of STI's strong points, visible in the curricula of most departments in this guide, is the combination of age-old philosophical questions and empirical methods. Whereas classical philosophy of science has often tried to find the foundation of knowledge in idealised models and lines of reasoning, science studies have transformed these questions into theory-relevant empirical questions (page 508).
This interdisciplinary nature is visible in the special research centres created in many European countries. They are problem-oriented and therefore part of cutting-edge research into the most interesting and intellectually exciting questions of today. STI studies can therefore be a powerful complement to training in the basic disciplines of science, social science or the humanities. Increasingly, technological innovation also transforms the very process of education. The global computer networks, the Internet, and the new communication technologies (page 447) create new possibilities to reshape the style in which one may be educated. They can, however, also be used to commercialise an increasing part of the educational process and "blackbox" teachers into pre-programmed learning routines. What type of higher education will result from this, also depends upon the public’s active engagement in these processes.

1.6 Communicating about science, technology or innovation

Whether one is a journalist, a public relations expert or a communication consultant, one is confronted with innovation daily. STI studies provide for a more independent and critical position with respect to scientific and technological claims raised by the interested parties involved. This is especially important when
dealing with public controversies (page 495). The scientific and technological developments create new dilemmas over which the specialists often contradict one another. Many STI studies in this guide aim to give a more in-depth insight in the nature of these controversies and in the inherently uncertain character of modern scientific knowledge.

The recent mad cow disease crisis (page 456) may be called the paradigm of this type of conflict. Scientific experts contradicted one another daily, political committees seemed paralysed in face of this lack of expert consensus, narrowly defined national interests seemed to be more important to the various governments than anything else, and the public did not know whether or not to eat that steak, except for the vegetarians. And the communication professionals were uncertain about what to communicate to whom.

This was not primarily caused by the still hypothetical nature of the prions, the proteins that are supposed to be the molecular cause of BSE and its human counterparts. Far more important was the socio-technical character of the dispute. The conflict was neither purely scientific nor political: science and politics overlapped. Indeed, a new type of politics seemed necessary to cope with this crisis. Technical expertise played a paradoxical role. On the one hand, science was pervasive at all levels, without science the BSE crisis would not even have existed. On the other hand, the experts routinely contradicted one another. In other words, the risks involved were created by the
1.6 COMMUNICATING

This is a general characteristic of "the risk society (page 456)" generated by the technological culture. One does not have to dig deep to encounter an endless array of these science-based societal controversies. Should we open up the potential of transplanting animal organs and tissue in humans? Or should we rather create clumps of human embryonic cells (page 480) for therapeutic goals? Is it true that the Internet (page 447) is radically transforming society or is this merely a hype inspired by the hardware-selling industry? Does the greenhouse effect (page 485) really exist, and if so, in what way could it affect human society? Or should we rather concentrate on preventing a sharp decline in the biodiversity of our planet? How much should we invest in advanced medical technologies and pharmaceuticals? Are novel foods (page 483) improving the quality of life or threatening it? Should one know what diseases one's genetic make-up makes one vulnerable to? And should one tell one's children? Because these conflicts and novel questions profoundly shape daily life in Europe, and will do so increasingly, they also create new challenges for all communication professionals.

Many modules and courses mentioned in this guide enable one to better understand the social dynamics in these public debates about scientific and technological innovation. It moreover facilitates distinguishing the real economic potential from the hype. And lastly, STI studies open a new window on the
process of communication (page 495) about science and technology itself. Several research projects, courses and modules, drawing upon technical and communicative expertise, concentrate on new forms of communication, the role of mediating technologies in reconfiguring the user, the interaction between medium and message. In short, STI studies may help make the professional communicator less likely to be swayed by the issues of the day.

1.7 Teaching science, technology or innovation

Lifelong learning, new social contradictions and accelerated innovation have created a fundamentally novel environment for education. Being able to incorporate knowledge about recent scientific and technological developments in education is fast becoming a necessity - where it formerly may have been more of a luxury. The technological culture and the public understanding of science (page 495) pose new challenges for the perceptive teacher and educator. They also create more incentives for the educator to be regularly taught himself. Because of its modular structure, many STI courses offer themselves alongside hands-on training in a way that is compatible with the need to keep working in education. Most STI centres actively collaborate with sister institutions. Even a few all-European stud-
ies, like the ESST Master’s Degree, are being offered and they promise to grow in the near future, possibly into a virtual European university. Apart from the substantive materials this offers, it may inspire to novel forms of teaching as well.

Crucial to grasping the nature of today’s societal development is the concept of evolution. Originally imported from the social sciences, it has taken a centre-stage position due to the rise of Darwinian evolution theory in explaining the diversity of life. In its turn, this modified evolutionary concept has re-entered the social sciences. In economics, evolutionary economics (page 459) has focused on the interaction between technological innovation and economic development. In sociology, the evolutionary paradigm has been connected to notions of self-organization to describe and explain the pluralistic and differentiated society we live in. The evolutionary paradigm can therefore also be used as a powerful educational device.

In more general terms, new educational devices are especially important since the fast social innovation processes set high standards for the skills the next generation needs. Whereas competent specialist capabilities seem to be more in demand than ever, narrow specialists are certainly out of vogue. Professionals are nowadays called upon to be able to use their specific expertise in a broad way, to communicate them to a variety of audiences, and to be aware of the societal and cultural values attached to them. These increased responsibilities not only call for a broad-based yet profound education, they also make at
least a rudimentary understanding of the dynamics in our technological culture a must for all. For this reason, it can be expected that acquiring an up-to-date insight in the interactions between science, technology, and society will become a necessity for an increasing number of teachers, if only because for them asking the right question is more important than knowing the answers.

1.8 Making use of STI

The sharply increased global competition, the accelerated pace of product and process innovation, and the higher quality standards of European consumers have radically changed the context in which most companies function. The environment of the firm has become more complex, placing new tasks on managers’ shoulders (page 471). Because of the increased need to innovate, knowledge has become a commodity with a high added value. The traditional boundaries (page 459) between users and producers of this strategic knowledge are being blurred. The division of tasks between companies, universities and research centres and the European and national states has changed. Universities play new roles as suppliers of competitive knowledge, often in newly created forms of collaboration with private firms. These, in their turn, have taken on new forms of knowledge production (page 503). Producing knowledge is
1.8. MAKING USE OF STI

an economic opportunity in various niches on the market.

This requires insight in these dynamics shaping the economic rhythm to which the individual firms must adapt. In this sense, STI studies in several European centres have focused on complementing the more traditional management courses and studies. In general, the need for managers to acquire new thinking habits (page 471) is stressed. This is sometimes termed "lateral thinking" and "global reasoning". Understanding evolutionary economics may provide for new ways of defining how innovation may work, especially for the firms that wish to compete through innovation. As many companies discovered too late, a solid technical invention is not enough to create a new position in economic life. Innovation is at least as much a social endeavour, often necessitating restructuring old habits and ways of communication. Because of the interdisciplinary nature of science, technology, and innovation studies, they may help to meet this urgent need to develop the capability to combine social and technical expertise. Last but not least, STI may help develop the necessary sensitivity to the social responsibilities of the company in a non-moralistic way.

Many STI centres are active members of transnational networks, extending to both the private and the public sector. Organising and attending regular courses may therefore not only be a matter of sensible human capital management, it may also provide new forms of connecting to existing knowledge bases and links with new partners in the knowledge-producing sec-
tors. Often this is seen as crucial in creating new forms of innovation and information management (page 471).

Research, technology, and development (RTD) networks are also deemed important because of one of Europe's most persistent and urgent problems: the high rates of unemployment (page 477). Innovation studies partly originated from concerns about unequal economic resources and hampered transfer of technology. This has stimulated the search for national innovation networks, for developing ways to unveil hidden sources of technological innovation, and for innovative strategies.

1.9 Making decisions

As already mentioned, the crisis over the mad cow disease has underlined the changing nature of making decisions in the risk society. It is an example of how innovation should not be managed. The technological culture has changed the agenda setting mechanisms. The new politics (page 456) is a hybrid of policy, science and technology. At the same time, the political process is also in a state of flux because of the end of the Cold War and because of European integration, which adds a novel network on top of the already existing national networks. Moreover, in an increasingly complex society, local and national authorities often feel the need to rebalance between the urge to steer and the demand to broker. Taken together, new forms of uncertain-
ties have been added to the political agenda. Upon the decision-maker rests the task to nevertheless at least try to look into the future. This means that the very idea of forecasting (page 499) is being transformed from prediction to scenario analysis.

This need of more advanced analysis of the complex relationships forging the future has been an important factor shaping the field of science, technology, and innovation studies. Indeed, the political dimensions of science and technology have been a focus of debate and research from the beginning of science and technology studies. More specifically, the oldest centres have often been created in direct response to policy needs. They combined an independent and critical intellectual agenda with policy advice and consultation. Over the years, the empirical and theoretical results (page 508) have built up a strong knowledge base for policy. They have also revealed where notions of steering science and technology were naive. Ironically, these studies have made clearer that policy decisions are only partially informed by knowledge; this also holds for political decisions with respect to science, technology and innovation.

Interestingly, science, technology, and innovation studies have developed a number of different, yet not incompatible, ways of describing and defining politically relevant interactions. Science and technology policy may not always have obtained the certainties they initially asked for, but the insight that social innovation is a highly uncertain process has certainly enriched the political vocabulary. They may also have increased
insight into the political role of scientists and engineers. The political process has become a distributed one, with as yet unknown potential for further developing the European tradition of democracy and self-determination. Social and technological innovation seems to spur this political evolution.

At the same time, it poses new dilemmas to the decision-makers in the public sector. In controversies over new technologies, like bio-technology or new types of research, decision-makers are expected to assume their responsibilities. Sometimes, they are even supposed to take the lead. More often than not, however, they are at least as much taken by surprise as the public at large. The disarray at both the national and European level in the heat of the mad cow disease exemplifies this phenomenon. STI studies will not solve this problem, of course. But they do provide more insight into why the political context is so often confronted with new risks and dilemmas. Even for alert decision-makers, knowing the right question to ask is more crucial than thinking they have the answers.
Chapter 2

The map of STI Education

In the following chapter, institutional information on education in science, technology, and innovation studies will be given. We have collected information about more than a hundred institutions from twenty European countries. Most educational activities have been developed in Northern and Western Europe. Courses which are still in the process of creation have not been included. Countries in Southern and Eastern Europe are catching up, however. We expect therefore that possible updates of this guide will include information from even more countries since STI courses were being created while we were writing
CHAPTER 2. THE STI MAP

this guide.

Countries covered include: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, The Netherlands, Norway, Portugal, Russia, Spain, Sweden, Switzerland, United Kingdom, Northern Ireland and Ukraine.
Chapter 3

Institutional information
3.1 Austria

3.1.1 Institute for Philosophy and Social Studies of Science, Vienna

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Profile

The institute was founded in 1987 as the first university institute in the field of STS in Austrian. It is attached to the Faculty of Basic and Integrative Sciences (Grund- und Integrativwissenschaftliche Fakultät) of the University of Vienna, which has about 22,000 students. The institute has two main sections, one geared towards more philosophical and historical questions on the development of the sciences and the second towards social studies of science.

The section for social studies of science started with only two permanent positions - of which one professor - in 1987 and was increased by a third permanent position in 1996. Other researchers are working on a temporary basis in the framework of research projects. In the past decade two research focuses have appeared to be predominantly represented, a third one is being built up:

- The first deals with questions of the relationship between the science system and the public in a large sense. This embraces questions related to risk-assessment and public communication of risk, the role of media in the construction of science policy agenda, the popularization of science in a historical perspective (late 19th and 20th century), and also a large number of more theoretical questions linked to issues of public understanding of science.
• The second research focus lies in the area of science policy questions. This embraces in particular research on the development of the contemporary university systems, university-industry relationship, quality assessment and its role in the science system, the changing modes of research, and the mechanisms at work in the development and establishment of new research fields.

• A third area of research dealing with feminist perspectives in the development of science and technology is being built up.

The department counts three permanent researchers.

Degrees:

Masters in sociology (specialisation sociology of science) and a PhD

With regard to teaching, the department does not have a full curriculum in social studies of science, but offers a wide range of topics in the field of STS. Sociology students can choose a specialisation in the sociology of the sciences on the master’s level. Students having done their master’s in the humanities or social sciences can choose to do doctoral theses at our department. Besides this, virtually all curricula inculde a certain amount of courses in history, philosophy or social studies of science. Students are free to choose their courses. This means
that the Institute is confronted with a large variety of students coming from very different backgrounds, which makes teaching rather challenging and which makes interdisciplinary work possible fairly early on. As for teaching, guest professors and other invited lecturers are regularly invited to enable a broad range of subjects to be covered.

Costs and admission criteria

There are no formal admission criteria when students are registered at the university; as far as students doing master’s work or doctoral theses is concerned, this is between the supervisor and the student. A master’s in the humanities is required for a PhD. There no special costs.

International collaboration

Cooperation is organised more on an individual basis than on an institutional one. The Institute regularly co-operates with:

- CRHST, La Villette, Paris et Paris X
- GERSULP, Université Louis Pasteur, Strasbourg, FRANCE
3.1.2 International Institute for Applied Systems Analysis, Laxenburg

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Profile

The International Institute for Applied Systems Analysis (IIASA) is an interdisciplinary, nongovernmental research institution sponsored by a consortium of National Member Organizations in 17 nations. Sustainability and the human dimensions of global change are key concerns in IIASA’s investigation of environmental, economic, technological, and social developments.

The main research programmes are:

- Global Environmental Change
- Global Economic and Technological Transitions
- Systems Methods for the Analysis of Global Issues
3.1. AUSTRIA

Systems Analysis of Technological and Economic Dynamics

One of the projects is the systems analysis of technological and economic dynamics. Considerable progress has recently been made on various techniques of economic modeling. Some of these models are based on deterministic differential and difference equations, and some on stochastic ones. The simplest among them can be analysed analytically, while the more elaborate ones can only be analysed by means of computer simulations. Several models display characteristics of an economic analogue of natural selection operating on a population whose members have different attributes and different degrees of fitness. As a result of this theoretical and simulation work, the tool kit for modeling technological and economic dynamics is significantly richer than it was a decade ago.

During the same period, there have been major advances in empirical understanding. There are now many more detailed technological histories available. Much more is known about the similarities and differences of technical advance in different fields and industries and there is some understanding of the key variables that lie behind those differences. A number of studies have provided rich information about how industry structure co-evolves with technology. In addition to empirical work at the technology or sector level, the last decade has also seen a great deal of empirical research on productivity growth and measured technical advance at the level of whole economies. A
considerable body of empirical research now exists on the facts that seem associated with different rates of productivity growth across the range of nations.

As a result of this recent empirical work, the questions that successful theory and useful modeling techniques ought to address now are much more clearly defined. However, the connection between the theoretical work and the empirical phenomena has so far not been very close. The philosophy of this project is that the chances of developing powerful new theory and useful new analytical techniques can be greatly enhanced by performing the work in an environment where scholars who understand the empirical phenomena provide questions and challenges for the theorists and their work.

At the present time, there are several places where theoretical work on technological and economic dynamics is carried out. This project, however, is unique in its philosophy and organisation. It has strong links with theoretical scholars, scholars such as those involved in the various Sloan Foundation Projects centered in the USA studying the comparative evolution of different industries, scholars working with the newly available datasets that enable the following over time the collection of establishments within a given industry, and scholars concerned with broader macro-economic questions, such as convergence.

A major distinguishing feature of the Systems Analysis of Technological and Economic Dynamics (TED) Project is the attempt to advance the theoretical understanding of technological
and economic evolution through a detailed model-based reconstruction of the essential empirical phenomena. At the same time, empirical researchers are confronted with the conjectures and results stemming from theory. Hence, it is part of the basic spirit and objective of the project to bring formal modelers and people who know the empirical details of the subject matter in close and continuing contact.

3.2 Belgium

3.2.1 Centre for Environmental Economics and Environmental Management, Gand

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| Email                    | http://allserv.rug.ac.be/ mdeclerc/CMM/ |
| WWW address              | Marc de Clercq |
| Contact Person           |
Profile

The Centre for Environmental Economics and Environmental Management (CEEEM) has, since its foundation, been active in different fields of environmental management. The underlying reason for its foundation was the increasing importance of environmental management as part of the general policy in companies. Environmental management goes much further than the optimisation of environmental-technical investments. It implies adjustments in company organisation, strategy, company culture and internal and external communication. The strategic dimension of environmental care also implies an integration of different entrepreneurial aspects (economic, technical, ethical, communicational) in a coherent environmental policy.

The CEEEM has a rich experience in research on environmental management systems, waste and emission prevention, environmental policy instruments and environmental accounting.

On request, the CEEEM also assists private companies with implementing an environmental management system.

The CEEEM maintains intense contacts with a worldwide network of management schools, more specifically with schools where centres similar to the CEEEM exist. The CEEEM takes part in the annual conferences of ‘The Greening of Industry’, is a member of the Group for Integration of Environmental and Economical Policy (OECD) and is a member of Enveco, the
3.2. BELGIUM

group of environmental experts of the European Union concerning the study of the economic instruments of environmental policy. In so doing, the Impulse Centre has the opportunity to compare the research results on an international scale.

3.2.2 Centre for Economic and Social Studies on the Environment, Brussels

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### 3.2.3 Centre for Intellectual Property Rights, Leuven

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**Profile**

The Centre for Intellectual Property Rights (CIR) was established in 1988 following an initiative of the law faculties of the Catholic University of Leuven and the Catholic University of Brussels. This Centre was founded in response to an increasing need felt by scientists, lawyers, technologists and companies. The object was, and still is, to gain a profound knowledge in patent, trade mark, design and copyright law. More in particular the CIR wishes to gain a better insight into new and evolving areas of intellectual property law (such as the protection of software, semi-conductor products and biotechnological inventions, standardisation and technology transfers) and the general problems of patents, trade marks, designs and copyright.
To concretise these objects the CIR organises a wide range of activities on an interdisciplinary level. These activities include fundamental research, the gathering of documentation, the provision of postgraduate teaching and scientific service to the community.

As a consequence of its various activities the CIR - celebrating in 1998 its tenth anniversary - has acquired an established reputation at both national and international level.

Activities

- Stimulation of scientific research

The CIR attracts promising researchers and stimulate them to undertake fundamental research possibly leading to a doctoral dissertation or other publications. A number of researchers have already been given the opportunity to carry out in-depth research into such areas as the legal protection of biotechnological inventions, the intellectual property rights of university inventors, copyright law in the changing culture and society of the Russian Federation, the interaction between intellectual property rights and (technical) standardisation, and the impact of the information society on intellectual property rights (research).

- Publication of a series of books
• Organisation of conferences and training programs
  At regular occasions, the CIR organises conferences and seminars as a platform for the discussion of current problems relating to intellectual property rights.

• Intellectual Property Chair
  Starting from 1990, and thanks to the support of the Vancraesbeeck fund, the Centre also organises a specific yearly program under the name "Chair of Intellectual Property Rights", in which training is provided in a specific area of intellectual property rights (patent law, trade mark law, copyright law).

• Consultancy services
  The CIR wants to create a forum where interested parties, in particular industrial small and medium-sized enterprises, can come for practical advice about specific intellectual property law problems. This service activity consists essentially in an orientation discussion and frontline advice. For the detailed solution referral is made to experts.
3.2.4 Cellule Interfacultaire de Technology Assessment, Namur

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Profile

The Cellule Interfacultaire de Technology Assessment CITA is a university and interdisciplinary research team specialised in Technology Assessment in the field of information and communication technology. CITA was created in 1988 by four departments of the University of Namur: the UER Méta-Informatique from the Computer Science Institute, the CRID Research Unit from the Faculty of Law, the Département Sciences, Philosophie et Sociétéé from the Faculty of Science and the Département d'Analyse Economique from the Faculty of Economic and Social Sciences.
Since 1991, CITA has been recognised by the Belgian Science Policy Office (Federal Office for Scientific, Technical and Cultural Affairs - OSTC) as a centre of excellence in the field of Technology Assessment (TA).

Main research projects are:

- Information Highways and Society
- Computerisation of Belgian Police Services
- Technology Assessment
- Inter-organisational Information Systems
- Computerised Health Cards and teledmedicine in general
- Technology Assessment of Urban Transportation Systems in the Walloon Region
- Electronic Data Interchange
- Law Courts Automation

This research has three interrelated scientific goals:

- Improving fundamental knowledge and skills in Technology Assessment methodologies and concepts
- Clarifying the concepts of risks of technological implementation and vulnerable society
• Developing knowledge, skills and know-how for TA practitioners within a TA network involving national and international partners.

Moreover, the research also has political and socio-cultural objectives:

• Enlightening and supporting the decision-making process concerning information technologies

• Promoting a TA culture within the general public with a view to providing better information and ensuring a greater involvement of potentially concerned groups and citizens in the decision-making process on Science and Technology policies.

Until 1995, the TA research was supported by investigations into three application fields (EDI, smart cards for health care, law courts computerisation). The theoretical and methodological results of the TA research are now being used and refined within the framework of the Information Society research.

The group has 4 members.

Education

CITA is also involved in the European inter-university programme on Society, Science and Technology (ESST) with 16
European universities. The aim of this programme is to train young European staff members sensitive to the relationships between innovation and society.

Costs and admission criteria

Admission and costs are according to the general rules of the FUNDP.

International collaboration

CITA participated into a research programme of the 'Conseil Economique et Social de la Région Wallonne' concerning the assessment and prospective of urban transportation systems in the Walloon Region. The main goal of this research was to develop and improve short-term TA methodologies and to evaluate the usefulness of permanent TA structures for the region.

Within the framework of the TA research, the CITA TA team collaborates with:

- the Information Federation for Information Processing (IFIP)
- the Conseil de la Politique Scientifique de la Région Wallonne the Groupe de Recherche pour une stratégie économique alternative (Brussels)
3.2. **BELGIUM**

- Bazis, a Dutch institution for the development and support of information systems applications in Dutch hospitals

- the Belgian Fondation Travail Université

- ATIM, an accompanying project of the AIM (Advanced Informatics on Medicine) program of the European Commission (DG XIII), specialised in the assessment of information technologies in medicine.

CITA also has or has had some contacts with other international TA institutions: Rathenau Instituut-NOTA (The Netherlands), STV and VITO (Belgium), TAB (Germany), the defunct OTA (USA)

**Communication**

CITA launched its own publications, Les Cahiers de la CITA some years ago. Most of them are in French but some are in English, Dutch or Spanish. CITA members also publish in other journals.

CITA has a large documentation centre dedicated to its research areas including Technology Assessment, EDI, Smart Cards, Information Highways, Economic Theories (Information Economics, Organisation Economics, Telecoms Eco-
nomics, Transaction Costs Economics, etc.). CITA has also a library data-base with more than 7000 references.

3.2.5 Centre de Recherches Informatique et Droit, Namur

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Profile

Information and communication technology creates profound changes affecting all sectors of society. They generate novel practices which deeply transform our way of life, and our production and consumption traditions. The impact on society is particularly visible in Internet services and interactive multimedia. At the conceptual level, these phenomena force us to rethink basic concepts, create entirely new solutions, not the least in the domains of law and economics. The Centre de Recherche
3.2. BELGIUM

informatique et Droit (CRID) aims to stimulate this rethinking, both in terms of fundamental and application-oriented research, in the fields of law and economics of information technology.

Research

CRID, which hosts some thirty researchers, has organised interdisciplinary research since 1980. Its principal research topics are:

- electronic transactions and contract law,
- intellectual property rights, and the protection of electronic products, processes and messages,
- cryptographies and information crime,
- public and personal freedom in the information society, and electronic democracy,
- the regulation and political economy of telecommunication,
- juridical information and database systems

Education

CRID’s research feeds its university courses, especially in the preparation of students for the “Diplôme d’études spécialisée
en droit et gestion des technologies de l’information et de la communication” (DES en DGTIC). This degree was launched in September 1992 by the Facultés Universitaires Notre-Dame de la Paix Namur. This interdisciplinary program is a one-year course. It is accessible to anyone with a university degree (second cycle).

Collaboration

CRID is closely associated with two other interfaculty centres in Namur (CITA Centre Interfacultaire de Technology Assessment) and CIDES (Centre Interdisciplinaire Droit et Ethique de la Santé), and it cooperates with a number of Belgian and foreign centres with similar objectives.
3.2.6 Law and Management in Communication and Information Technologies, Namur

<table>
<thead>
<tr>
<th>Name</th>
<th>Post-graduate Diploma in Law and Management in Communication and Information Technologies (DGTIC)</th>
</tr>
</thead>
</table>
| Address | Rue Grandgagnage  
| | 21 5000 - Namur, Belgium |
| Phone | 32-81/72.47.69 |
| Fax | 32-81/72.47.71 |
| Email | laurence.lecocq@fundp.ac.be |
| WWW address | http://www.info.fundp.ac.be |
| Contact Person | Christine Danneel, Laurence Lecocq |

Profile

The dramatic rise and constant progress of data and telecommunications technologies is contributing directly to a spectacular development of services related, whether directly or indirectly, to the processing and transmission of information. The current Technological (R)evolution is giving birth to practices which are at the root of a deep transformation in the way we live, in our habits of production and consumption. Indeed, we are all taking part in the progressive inauguration of a new social structure: that of the "Information Society".

Such an upheaval raises several technical, judicial and eco-
The degree course "Law and Management in Communication and Information Technologies" (DGTIC: Droit et Gestion des Technologies de l'Information et de la Communication) intends to provide answers to these questions in the light of four complementary disciplines: law, management, economics and technology. The degree course is organised by the faculties of Law, Economics and Business Management, together with the Institute of Computer Technology. The curriculum aims to educate and empower the student to attain the following goals:

- **Awareness**: The student must be able both to comprehend the reality of new information and communications technologies (NICT) and to perceive the challenges and social changes they imply.

- **Analysis**: Thanks to a multidisciplinary approach, the student will gain a command of those concepts which enable rigorous analysis of the judicial, economic and technical issues raised by the emergence and diffusion of NICT.

- **Action**: Through individual case studies the student is confronted with practical problems facing either businesses that produce or use products and services connected to NICT, or the State in its role of market regulator.
3.2. Belgium

Program

It is a one-year course of 500 daytime course hours. The programme consists of courses, seminars and conferences (30 hours). The courses comprise law courses, computer technology courses, management courses, economics courses, and sociology courses. The seminars concentrate on information and communication technologies market (60 hrs) and development of an information system, which is a case study (60 hrs).

Costs and admission criteria

The course is open to students with a graduate degree. An active knowledge of French is required as well as the ability to read texts written in English.

Registration fee: 25,850 BEF for the academic year 1997-1998.
3.2.7 Department of Sciences, Philosophies, Societies, Namur

<table>
<thead>
<tr>
<th>Name</th>
<th>Department of Sciences, Philosophies, Societies, FUNDP, Namur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Rue de Bruxelles</td>
</tr>
<tr>
<td></td>
<td>61 B-5000 Namur, Belgium</td>
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<tr>
<td>Phone</td>
<td>2 81 72.41.17</td>
</tr>
<tr>
<td>Fax</td>
<td>32 81 72.41.18</td>
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<tr>
<td>Email</td>
<td><a href="mailto:jean-paul.leonis@fundp.ac.be">jean-paul.leonis@fundp.ac.be</a></td>
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<td>WWW address</td>
<td><a href="http://www.fundp.ac.be">http://www.fundp.ac.be</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Jean-Paul Leonis</td>
</tr>
</tbody>
</table>

Profile

Important themes are: Epistemology and History of Sciences; Ethics, Science and Technology; Theology; Science and Society; University and Development; Ethics and Health Policy; Technology Assessment.

Research is conducted in four projects:

- Epistemological, ethical, ontological and juridical approach of the medical experimentation. The responsibility of the Ethics Committees. Proposals for legislation.

- Scientific and technological innovations in dealing with the objectives of global quality, hybridisation of knowl-
edge and crossbreeding of cultures for sustainable global co-development. The project aims to propose a conceptual framework, theoretical and practical conditions and means for sustainable S & T strategies in order to break the dynamics of exclusion and bad development in North and South. The outcome is suggested by interdisciplinarity and priority to the field originating in vital sectors (health, energy), global quality (effectiveness/efficiency), crossbreeding of knowledge and know-how and communication modes through associative networking, thanks to case studies and building science, technology, and innovation indicators.

- **Science & Technology teaching and Society.** The project aims to clarify the societal goals of scientific and technical teaching in secondary schools. It aims to give meaning to that teaching, to develop rigorous interdisciplinary methodologies, to clarify the meaning and goals of scientific literacy and to map out the ethical dimensions of science teaching.

- **Foundations of the surprising effectiveness of mathematics in natural sciences.** The purpose is to exhibit the effectiveness of mathematical formalisms in physics, chemistry, and biology. Studying comparatively the effectiveness of mathematics in these various branches, an effort is
made to analyse the specific status of theoretical physics. The aim is moreover to exhibit some less known elements of the life and the work of Georges Lemaître to shed some light on the relations between his scientific work and his philosophical or religious ideas.

The department has 11 teaching and research staff members.

**Education**

This department is charged with the "humanistic education" of the students in science and medicine. It gives introductory courses in philosophy of science, epistemology, history of science, morality, psychology and the religious sciences. By this education, it hopes to sustain reflection on the ethical, social, educational, institutional, political, economic, religious and symbolic dimensions of science and technology.

**Costs and admission criteria**

Admission and costs are according to the general rules of the FUNDP.

**Collaboration**

The department collaborates with:
3.2. BELGIUM

- Department of Sciences, Philosophies, Sociétés, Facultés Universitaires Notre-Dame de la Paix, Namur, Belgique.

- Institut de Recherches en Substances Naturelles, Ougadougou, Burkina Faso.

- Université Nationale de Colombie, Medellin, Colombie.

- Faculté de Médecine Vétérinaire, Université de Liège, Liège, Belgique.

- TV-UNAM, Universidad Nacional Autonoma de Mexico, Mexico, Mexique.

3.2.8 Interdisciplinary Centre for Law and Information Technology, Leuven

<table>
<thead>
<tr>
<th>Name</th>
<th>Interdisciplinary Centre for Law and Information Technology</th>
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<tbody>
<tr>
<td>Address</td>
<td>Catholic University Leuven</td>
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<tr>
<td>Tiensestraat 41</td>
<td>3000 Leuven, Belgium</td>
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<tr>
<td>WWW address</td>
<td><a href="http://www.law.kuleuven.ac.be/icri/">http://www.law.kuleuven.ac.be/icri/</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Nicole Verbiest</td>
</tr>
</tbody>
</table>
Profile

The Interdisciplinary Centre for Law and Information Technology (known by its acronym ICRI, derived from the Dutch name for the Centre, - Interdisciplinair Centrum voor Recht en Informatica) is a research centre within the Faculty of Law. Directed by Prof. dr. Jos Dumortier, it comprises three different research teams which deal with the following areas:

1. Information Technology Law: legal aspects of the Internet, legal aspects of information security, personal data protection, IT contracts, law enforcement in cyberspace, electronic fund transfer, legal aspects of EDI in the public sector;

2. Telecommunications Law: international telecommunications law, European competition law in the telecommunications market, legal consequences of the convergence between the audio-visual and the telecommunications sectors;

3. Legal Informatics: legal knowledge representation, legal information retrieval, automatic indexing and abstracting.

In each of these three fields, ICRI carries out research, provides consultancy services and is active in education.
3.2. BELGIUM

Education

For various reasons, e.g. new technologies, convergence, liberalisation, etc. - telecommunications law has become one of the fastest growing areas of law and consequently an increasing number of lawyers encounter issues in this field. There is a growing demand for lawyers with specific skills and knowledge of information technology and telecommunications law.

The Interdisciplinary Centre for Law and Information Technology has tried to fill this gap by offering a series of advanced high-quality lectures on telecommunications law. Experts from national and international administrations, representatives from the private sector and academic experts have presented the most recent regulatory and legislative developments in the telecommunications sector.

The centre moreover offers courses on the following topics:

- Telecommunication
- Seminars on human rights on the Internet
- Skills in automated information systems
- Information law
- Juridical information science
- Law and information science
• Telecommunication laws

3.2.9 Studies on Media, Information and Telecommunication, Brussels

<table>
<thead>
<tr>
<th>Name</th>
<th>Studies on Media, Information and Telecommunication SMIT Free University Brussels</th>
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<tbody>
<tr>
<td>Address</td>
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<td>Email</td>
<td><a href="mailto:bcammaer@vub.ac.be">bcammaer@vub.ac.be</a></td>
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<td><a href="http://www.vub.ac.be/SCOM/smit/">http://www.vub.ac.be/SCOM/smit/</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Bart Cammaerts</td>
</tr>
</tbody>
</table>

Profile

SMIT is a research centre located at the Free University Brussels (Vrije Universiteit Brussel) and connected with the section communication sciences at the university. Its main research topics are new media and telecommunications policy and the societal impact and use of information and communication technologies.

Among the current projects are:
3.2. BELGIUM

- support for an interactive website for "Agora98", an initiative of the federal government and the regulator BIPT, financed by BIPT.

- technologically mediated practices. Acceptance, use and meanings of ICTs in everyday life

- social learning in multimedia - Targeted Social Economic, Research, in co-operation with CITA - Namur

- media, signification and information. The mediatisation of the public sphere between dualism and democratisation

- innovation within the service sector: The use of interactive networks by retailers

- socio-Economic and regulatory preconditions for innovation in multimedia services in Flanders, a Medialab Project

- research on and interdisciplinary assessment of the information society: networks, users and role of the state

- role, mechanisms of influence and conflict areas of the European competition policy concerning the audio-visual culture industry
CHAPTER 3. INSTITUTIONAL INFORMATION

- telecommunication, liberalisation, privatisation and development in the third world. A critical analysis and prospective evaluation of telecommunication policy in Southern Africa

- Information technology policies of international organisations in Sub-Saharan Africa

The centre has 8 staff members.

Education

It is possible to obtain a PhD degree at the centre.

Costs and admission criteria

The general rules of the Free University Brussels apply.

International collaboration

- ENCIP European Network on Communication & Information Perspectives

- NETEPS Network on European Communications Policy and the Peripheral Regions/Small Countries

- IUAP Inter Universitaire Attractie Pool-IV: Belgisch interuniversity network
3.2. BELGIUM

- REFD Reseaux Europeen de formations doctorales en sciences de la communication - a European network of 10 universities

- COBRA Co-operation Brussels-Amsterdam (Inter University research network)

- BCAS, Brussels Centre for African Studies (Joint Research Centre of the ULB and VUB). BCAS is member of AEGIS (Africa-Europe Group for Interdisciplinary Studies)

3.2.10 Flanders Technology Foundation, Brussels

<table>
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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Address</td>
<td>Jozef II Str. 12-16</td>
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<tr>
<td></td>
<td>1000 Brussels, Belgium</td>
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<td>Phone</td>
<td>(02) 217 0745</td>
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<td>Email</td>
<td><a href="mailto:blauwers@serv.be">blauwers@serv.be</a></td>
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<td>WWW address</td>
<td><a href="http://serv.be">http://serv.be</a></td>
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<tr>
<td>Contact Person</td>
<td>Brigitte Blauwers</td>
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</table>

Profile

The Flanders Technology Foundation (STV) is actively engaged with technological developments in the private sector.
In its projects an attempt is made to study the background to these developments in order to enhance the utility of these insights for managers, company directors and trade unionists. In STV’s approach, the relationship between technological and organisational innovation, and the role of labour is central. An innovative company not only invests in technology but also uses the potential of its staff creatively. The Foundation has 17 staff members.

Activities

The Foundation organises studies and surveys, publishes reports, organises conferences and seminars, and hosts a documentation centre. The documentation centre has a collection of literature on:

- the organisation of labour
- production technology
- technology policy
- telematica
- flexibility
- teamwork
- quality control and management
3.2. BELGIUM

- stress
- sectoral economic information

3.2.11 ESST at UCL, Louvain

<table>
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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Address</td>
<td>Catholique de Louvain</td>
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<tr>
<td></td>
<td>Collège Jacques Leclercq</td>
</tr>
<tr>
<td></td>
<td>Place Montesquieu 1, 1348</td>
</tr>
<tr>
<td></td>
<td>Louvain-la-Neuve, Belgium</td>
</tr>
<tr>
<td>Phone</td>
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<tr>
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<td><a href="http://www.ucl.ac.be">http://www.ucl.ac.be</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Frédéric Lints</td>
</tr>
</tbody>
</table>

Education

The “European Inter-University Association on Society, Science and Technology” (ESST) consists of 15 universities which have concluded an agreement for the promotion of education and research programmes aimed at improving awareness and command of the necessary links and potential synergies between society, science and technology among decision-makers in Europe.
In Belgium, the Université Catholique de Louvain and the Facultés universitaires Notre-Dame de la Paix de Namur offer a degree course in co-operation with the Free University Brussels.

Based on recent research on the interfaces between science, technology, the economy and society, this one-year programme comprises six months education in one's home country and six months at a foreign university. At the UCL, two specialisations are possible: "risk management" and "biotechnologies and society". In Namur, three specialisations can be chosen: "legal and technical aspects of new information and communication technologies, science and technology", "education and society", and "technology assessment".
3.2.12 LENTIC, Liege

| Name          | LENTIC  
|---------------|-------------------------|
|               | Laboratoire d’Etudes sur les Nouvelles Technologies de l’Information, la Communication, et les Industries Culturelles  
|               | University of Liege  
| Address       | Chemin du Trèfle 1, Bâtiment B31  
|               | 4000 Liège, Belgium  
| Phone         | 32 4 366 3070  
| Fax           | 32-4-366 2947  
| Email         | Lentic@ulg.ac.be  
| WWW address   | http://www.egss.ulg.ac.be/Lentic/  
| Contact Person| Bérengère Piroton  

Profile

LENTIC, founded in 1986, is an interdisciplinary laboratory at the University of Liege focusing on the analysis of the innovation process, especially with regard to information and communication technologies. Research at the laboratory studies the conditions, the forms and the potential implications of the innovation process both at the macro-social level and at the organisational level.

For a number of years LENTIC has been studying the so-
cial, economic and organisational aspects of the information society, in particular the economic and industrial strategies of the principal players and the dynamics of the forms of use of these technologies. After having studied the conditions of the development of videotext in several European countries, LENTIC has, amongst other things, studied the development of new communication services taking into account the constraints and opportunities created by regulatory regimes; the development of information highways; the use made of these new services; and the reconfiguration triggered by the new technologies in the communication sector. LENTIC is also specialised in the analysis of the functioning of organisations, taking special account of processes of change.

The laboratory has around 12 researchers.

International collaboration

LENTIC cooperates with a number of international and national research centres.
3.2.13  Flemish Institute for Technological Research

<table>
<thead>
<tr>
<th>Name</th>
<th>Flemish Institute for Technological Research (VITO)</th>
</tr>
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<tbody>
<tr>
<td>Address</td>
<td>Boeretang 200, B-2400 Mol, Belgium</td>
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<td>+32 (0)14 33 55 11</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Pype Rosemarie</td>
</tr>
</tbody>
</table>

Profile

VITO, the Vlaamse Instelling voor Technologisch Onderzoek - Flemish Institute for Technological Research, provides the business world and government agencies with multidisciplinary assistance in applied research and development. VITO is active in the fields of environment, energy and materials. In carrying out assignments, VITO offers quality, efficiency, compliance with agreed deadlines through goal-oriented, co-operative effort based on confidentiality. VITO aims to carry out national and international assignments in the framework of regional, national or European research projects knowledge transfers and specialised research for industrial companies.

VITO has a dynamic organisational structure subdivided
into centres of expertise. This has a positive impact on internal co-operation.

Ten centres of expertise cover 3 different areas: energy, environment, and materials.

3.3 Denmark

3.3.1 IKE, Department of Business Studies, Aalborg

<table>
<thead>
<tr>
<th>Name</th>
<th>The IKE Group</th>
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<tbody>
<tr>
<td>Address</td>
<td>Department of Business Studies, Aalborg University</td>
</tr>
<tr>
<td>Address</td>
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<td>Email</td>
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</tr>
<tr>
<td>WWW address</td>
<td><a href="http://www.business.auc.dk/ike">http://www.business.auc.dk/ike</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Bent Dalum</td>
</tr>
</tbody>
</table>

Profile

The IKE Group (Danish acronym for Industrial Development and International Competitiveness) is part of the Department of Business Studies of Aalborg University. The group was established in 1977 and has gradually evolved into a long-term re-
search programme in the field of economics of innovation and
industrial economics. It has combined applied research (on e.g.
productivity, innovation statistics and international specialisa-
tion in trade and technology) with theoretical work in close
contact with international research teams. These issues are
now wide-spread in the portfolio of many universities, although
some concentrations can be found in e.g. the universities of
Sussex (SPRU), Maastricht (MERIT), Strasbourg (BETA) and
Manchester (PREST) in Europe and at Stanford and MIT in the
US. A common label for the theoretical approach has been put
forward as evolutionary economics.

The main research themes of IKE are:

1. Systems of Innovation
2. Innovation, Productivity and Competitiveness
3. Technological Change, Trade and Globalisation
4. General Institutional and Evolutionary Economics

The group contains seven researchers and a group of PhD
students.

The DISKO project

DISKO is a 3-year research project financed by the Ministry of
Business and Industry and launched by the IKE Group in Jan-
CHAPTER 3. INSTITUTIONAL INFORMATION

uary 1996. The direct objective of the project is to enhance knowledge of the Danish System of Innovation and to give policy-making in Denmark a stronger analytical foundation. A more general objective is to confront the theoretical analysis on systems of innovation with systematic empirical testing and to develop a general methodology for studying national innovation systems which takes into account the fact that innovation is an interactive learning process rooted in the system of production.

Education

The PhD programme on the Economics of Industrial, Technological and Institutional Change

The PhD programme on the Economics of Industrial, Technological and Institutional Change is one of the two sub-programmes of the economics PhD programme at Aalborg University. The sub-programme has been developed since the 1980s by the IKE Group at the Department of Business Studies. It was formalised as a part of the general reorganisation of the PhD programmes at the Social Science Faculty in 1993.

The programme has for several years been part of two PhD networks, of which one is European and the other Danish.

1. The PhD programme is part of the ETIC PhD Programme (Economics of Technological and Institutional Change) organised by Bureau d’Economie Thorique et
3.3. DENMARK

Applique (BETA), University of Strasbourg; Maastricht Economic Research Institute on Innovation and Technology (MERIT), University of Maastricht, and IKE, Department of Business Studies, Aalborg University. The ETIC course programme consists of six weeks of activity divided into a two-week project session and four one-week course modules; the four course modules are put together in two two-week sessions. The six-week programme (three two-week sessions) is extended over 1 year with a two-week session every half a year. The current three-year period (1996-98) started with the two-week project session in Maastricht from 10 to 21 May 1996. The four course modules are:

(a) Microeconomics of innovation, technology management and the theory of the firm.
(b) Evolutionary modelling of technical change and economic dynamics.
(c) Macro-dynamics of growth and trade in open economies.
(d) Systems of innovation and technology policy.

2. The PhD programme is also member of the Danish Technology-Society PhD Network which includes research groups at Aalborg University (two groups), Technical University of Denmark (two groups), Copenhagen
Business School (two groups), and Roskilde University (two groups). Within this network a three-day introductory course and several specialised courses are offered. Participation in the courses has been supported by the Danish Research Academy.

The methods of PhD training within the IKE Group have evolved gradually, starting from an apprenticeship model according to which the work of a junior researcher takes place in co-operation with and under supervision of a senior colleague. This model has gradually been changed towards one with more systematic PhD studies.

**Costs and admission criteria**

The requirements for a PhD degree is a 3 year doctoral study unless there has been a transfer of credits from previous activities. In order to deliver a dissertation for assessment there must be a statement from the supervisor confirming a satisfactory doctoral study.

Before entering a 3 year doctoral programme the candidate must have completed a Master’s Degree in Economics or acquired equivalent academic qualifications. The IKE PhD programme can also be attended by business economists.

An application must contain a preliminary study programme including the title of the proposed PhD project.
3.3. DENMARK

and an outline of the 3 years of study: plans for participation in courses/seminars (subjects); plans for studying abroad/participation in research communities external to the institution; as well as a description of the main research problems to be explored. Furthermore the application must contain a curriculum vitae, including documentation of academic degrees, as well as a plan for financing the study.

The application should contain information about any previous enrolment as doctoral student. Relevant working experience will be taken into consideration in assessing the applicants. The application should be handed in to the Faculty of Social Sciences in 4 copies. An application is considered by a committee who recommends enrolments to the head of department, who in turn gives the final recommendation to the dean of the faculty.

There are basically two financial models:

- The applicant, simultaneously with applying for enrolment as a doctoral student, applies for a publicly announced vacant PhD scholarship which covers study fee and salary for the doctoral student. A scholar is required to spend 840 hours working as a teacher or research assistant during the 3 years of study.

- The applicant is 'self-financed'. Information about the level of the study fee can be acquired from the Faculty
of Social Sciences (the 1996 levels for study fees were between 60,000 and 120,000 DKR per annum depending on whether the university provides working space, equipment etc.).

Collaboration

The IKE Group participated in the establishment of the Danish Research Unit for Industrial Dynamics (DRUID). This unit - in which researchers from the Department of Industrial Economics and Strategy at the Copenhagen Business School and from the Southern Denmark Business School also participate - covers a field which is defined as 'the Industrial Dynamics tradition' starting from e.g. the Marshallian tradition and the evolutionary and Schumpeterian tradition in industrial economics. At the same time it links to a broad set of recent research, including transaction cost economics, evolutionary modelling, growth theory, trade theory, etc.
3.3.2 DRUID, Copenhagen

<table>
<thead>
<tr>
<th>Name</th>
<th>DRUID</th>
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<td>Contact Person</td>
<td>Annelise Klüwer</td>
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</tbody>
</table>

Profile

The objective of DRUID is to contribute to a better understanding of the dynamics of technical, structural and institutional change at the level of the single firm as well as at the inter-firm level and the level of the economy as a whole. Special attention is given to fundamental trends such as the growing importance of knowledge for competitiveness, the information technology revolution, the ecological crisis and the internationalisation of the economy.

The staff (about 30 scholars) integrates the IKE Group from the Department of Business Studies (DBS), Aalborg University (AAU) and a group of industrial economists from the Institute
of Industrial Economics and Strategy (IVS), the Copenhagen Business School (CBS), and people from the Department of Business (DB), Southern Denmark Business School (SDBS), as well as two individual professors.

The research programme of DRUID is about the dimension of industrial economics, "industrial dynamics", and defines the evolution of industry as a process in time both at macro level, the sector or industry level, and the firm level. In this perspective some of the variables which remain exogenous in standard industrial economics - technology, preferences and institutions, including rules and norms of behaviour - become endogenous. The perspective of industrial dynamics becomes increasingly important. In an economy where the competitiveness of people, firms and national systems is based on their capability to learn, it is unsatisfactory to assess the economic structure exclusively from an allocation perspective. Pure markets, pure competition and pure instrumental rationality may be ideal when it comes to allocating existing resources. They are not ideal for and actually incompatible with an economy where innovation and learning determine long-term performance.

Education: the Ph.D. programme

There are at present more than 10 Ph.D. students working closely with the DRUID research programme. DRUID regularly organises specific Ph.D activities such as workshops, sem-
inars and courses, often in co-operation with other Danish or international institutes. Also important is the role of DRUID as an environment which stimulates the Ph.D. students to become creative and effective. This involves several elements: access to the international network in the form of visiting fellows and visits to sister institutions, participation in research projects, access to supervision of theses, and access to databases.

Each year DRUID welcomes a limited number of foreign Ph.D. students who want to work on subjects and projects related to the DRUID research programme.

Theme A The firm as a learning organisation

This theoretical perspective confronts and combines the resource-based view with recent approaches where the focus is on learning and the dynamic capabilities of the firm. The aim of this theoretical work is to develop an analytical understanding of the firm as a learning organisation. The empirical and policy issues relate to the nexus technology, productivity, organisational change and human resources. More insight into the dynamic interplay between these factors at the level of the firm is crucial to an understanding of international differences in performance at the macro level in terms of economic growth and employment.

Theme B Competence building and inter-firm dynamics
The theoretical perspective relates to the dynamics of the inter-firm division of labour and the formation of network relationships between firms. An attempt will be made to develop evolutionary models with Schumpeterian innovations as the motor driving a Marshallian evolution of the division of labour. The empirical and policy issues relate the formation of knowledge-intensive regional and sectoral networks of firms to competitiveness and structural change. Data on the structure of production will be combined with indicators of knowledge and learning. IO matrixes which include flows of knowledge and new technologies will be developed and supplemented by data from case studies and questionnaires.

Theme C The learning economy and the competitiveness of systems of innovation

The third theme is aimed at a stronger conceptual and theoretical base for new concepts such as 'systems of innovation' and 'the learning economy' and to link these concepts to the ecological dimension. The focus is on the interaction between institutional and technical change in a specified geographical space. An attempt will be made to synthesise theories of economic development emphasising the role of science based-sectors with those emphasising learning-by-producing and the growing knowledge-intensity of all economic activities. The main em-
3.3. DENMARK

Empirical and policy issues are related to changes in the local dimensions of innovation and learning. What remains of the relative autonomy of national systems of innovation? Is there a tendency towards convergence or divergence in the specialisation in trade, production, innovation and in the knowledge base itself when we compare regions and nations?

International collaboration

DRUID has a close co-operation with 6 European research units (BETA from France, MERIT from the Netherlands, SPRU and CRIC from the UK, ISIDE from Italy and FhG ISI from Germany) in research projects, common PhD programmes and exchange of researchers and PhD-students. DRUID also has an international Scientific Advisory Board. Several of the members of DRUID are participating in the European research programmes.
3.3.3 Department of Industrial Economics and Strategy, Copenhagen

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<td>Contact Person</td>
<td>Hanne Bruun (MOT-administrator)</td>
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Profile

**Education: a Master of Science program**

The increased emphasis on the development of knowledge in businesses poses new challenges to the conduct and analysis of businesses. Standard solutions, thus, become less relevant compared to the ability to analyse needs and opportunities and identify useful strategies. The Copenhagen Business School offers a Master's degree programme which specifically addresses these challenges. The programme is called the Management of Technology Programme (MOT).

The Programme has two main purposes:
1. Firstly, the aim is to build an understanding of the business as an integrated whole, recognising knowledge as a cross-organisational resource.

2. Secondly, the objective is to develop the students' analytical abilities in the areas of innovation research and development.

The Management of Technology Programme is founded on the co-operation of 3 departments at the Copenhagen Business School and it is a truly interdisciplinary education. Instructors are all deeply involved in research activities related to the overall themes of the Programme. Not only are Management of Technology graduates trained to conduct clear and structured multi-disciplinary analysis of complex theoretical and empirical problems, but also the application of theory and analysis in practice is continuously demanded and measured in order to build these capabilities. Furthermore, the graduates’ experience in both individual and team work make them valuable to most organisations.

Additionally, students are required to take active responsibility for the quality of their education. Thus, since the establishment of the Management of Technology Programme there has been close co-operation between Programme students and instructors. This is made possible by the relatively small size of each class of students (which varies between 30 and 50) and
is encouraged by the nomination of an Executive Committee of students meeting regularly with Programme instructors.

The strong social integration among students and between instructors and students provides each student with a valuable network in his/her future undertakings.

In summary, the Management of Technology Programme aims to provide an environment in which profound analytical capabilities, individual and team skills, a sense of responsibility, and the establishment of personal networks are fostered.

The degree programme has a broad aim with regard to the type of jobs which can be filled by graduates upon graduation.

The unique strength of the graduates is their ability to deal with the technology-economy nexus of a business enterprise in an integrated manner. That is, on the one hand, to acknowledge the economic aspects of technology and knowledge development and, on the other hand, to recognise the strategic significance of technology and knowledge production. This is specifically sought in case studies and writing projects.

Most of the curricula in the courses of the first two semesters consists of state-of-the-art research literature from journals. Students thus learn to understand and explicitly relate to current research literature about the relationship between technology and the operation of a business. Furthermore, the aim of the mandatory courses is to provide students with a set of relevant and applicable tools. Throughout the 2-year programme students are explicitly encouraged to relate theories to
the actual operation of the business, that is in writing projects, analysing cases, inviting business managers to present different issues etc.

The study methods at the Management of Technology Programme are quite demanding and are facilitated by the division of each class into groups of 4-5 students. Abstracts are written on all articles and texts. Typically this work is shared among students within a group so that each student is responsible for one abstract per lecture. The abstracts are copied for all members of a particular group and serve as a basis for group discussion prior to classes. This process enables class discussions to start at a high level and also to draw on more specialised expertise of instructors.

**Costs and admission criteria**

The main criteria for evaluating student performance are the clarity and structure of the analysis of complex theoretical and empirical problems. The objective is to motivate and encourage students to develop these capabilities which apply to a large range of positions.

Should the students decide to study in Copenhagen during the third semester, they can choose courses from the entire range offered by the Copenhagen Business School. The Management of Technology Programme offers a limited number of courses which build specifically on the knowledge obtained in
the first two semesters. The type of exam varies depending on
the courses which each student chooses. Any exams taken at
the Copenhagen Business School are typically either 20-minute
individual, oral exams or 4-hour written exams.

All exams are in English. As they vary in type from most
other business schools the exams are described in some detail
below.

To complete the degree, the fourth and final semester is en-
tirely dedicated to writing a thesis. Thus, 5-6 months of indi-
vidual, full-time study are assigned to this project. Compared to
other business schools, this is very comprehensive and its aim
is to enable students to conduct longer-term projects of a larger
scale (80-100 pages required).

3.3.4 Department of Social Studies, Roskilde Uni-
versity Center, Roskilde

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<td>Lars Fuglsang</td>
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</table>
Profile

The Department of Social Sciences is one of the largest units within Roskilde University (RUC). At the same time it is the only department for social sciences. It was founded in the mid-1970s as a multidisciplinary unit and established with the purpose of undertaking academic and policy oriented research within the fields of public administrations and business economics.

Education

All studies at Roskilde University commence with one of the two-year basic studies programmes in the humanities, the social sciences, or the natural sciences. Briefly, these programmes have two aims: to provide broad, interdisciplinary introductions to the more specialised degree programmes, and to train students to work on problem-oriented projects in groups, thus learning through a research-like process.

The degree structure at Roskilde University, like in the rest of the universities in Denmark, is designed to last three, five or eight years. Thus the students can obtain bachelor’s, master’s and Ph.D. degrees at the Department of Social Sciences.

The Basic Studies Programme

All degree programmes at the Department begin with a two year general social science basic studies programmes. The prin-
CHAPTER 3. INSTITUTIONAL INFORMATION

cinciple behind the Basic Studies programme is to provide all students with an introduction to the central theories in social science. The students receive both a theoretical and methodological grounding in the major disciplines of the particular field, they develop their communication skills (written and oral) and they are trained to plan and undertake major written reports. These activities are a preparation not just for further study but also for jobs that require independence, maturity and the ability to work with others.

The Bachelor Programmes

The two-year basic studies programme is followed by specialised degree programmes. The students can receive a bachelor's degree (B.A. or B.Sc.) by taking two modules (a module being defined as the workload of an average student during one semester) from one of the Department's subjects; thus the bachelor's degree lasts three years, including the two years of basic education. Upon completion of the third year the student is awarded a bachelor's degree in social sciences.

Master's Programmes

After the bachelor's degree the student can continue on the master's programme. It takes a further two years. This means that a master's at the Department takes a total of five years of study.

Ph.D.-Programmes

Postgraduate studies are available in the form of three-year Ph.D. programmes. Under most circumstances students are
only admitted to these programmes if they have a good master's degree and show an ability to fulfil a research project.

The Department has two Ph.D. programmes. One is in Comparative Welfare Systems and the other is in Technology Policy, Innovation and Socio-Economic Development.

**Post-Graduate Diploma in Public Policy**

Master of Public Policy (MPP) was set up in 1996 following an initiative by The University of Roskilde and The Danish School of Public Administration. It was prompted by the observation that there were no postgraduate courses that did full justice to the goals and changing perceptions of the public sector. The forces operating in the area of public sector management differ somewhat from those in a market organisation. This was the motive for designing a special course, namely the MPP programme that runs for two years and follows a fixed schedule.

**International Master’s Programme Society, Science and Technology in Europe**

The department has excellent contacts throughout Europe. In co-operation with other European universities, the department offers master’s students the chance to participate in, among other things, two international master’s programmes each based upon extensive international exchange of students and teachers. One of them is the Master’s Programme Society, Science and Technology in Europe (ESST).
This is a European Master’s programme, where the teaching is co-ordinated between 11 European Universities. It is based on an international exchange of teachers and students. The programme has been designed and co-ordinated by the European Inter-University Association of which Roskilde University Centre is a member. The programme at RUC is run by the Department of Social Sciences.

The main point of the study is to contribute to a better understanding of modern technological and scientific development, to integrate our understanding of the interrelations between technology, science and society. The approach is interdisciplinary and based on current research on the technological, scientific and socio-economic development. The course will use this research, studying the technological and scientific developments in the light of social, economic, political and cultural aspects.

In the first half of the year, each student takes a common curriculum in his/her home country. The modules of the common curriculum are:

- European Problems of Society, Science and Technology
- The Historical Perspective on Scientific and Technological Change
- Science and Technology in the Making: Entering the World of the Laboratory
3.3. **DENMARK**

- Globalisation and the Regulation of Science and Technology
- The Politics of Knowledge

In the second semester, the student chooses one of a range of specialist options and will be expected to spend the semester in another European country (some funding is available via the European Union’s ERASMUS/SOCRATES programme). This semester allows the student to study a subject in greater depth. After a short introductory course the student works on a Master’s dissertation. The student has one year to finish off his/her dissertation and is judged to have either 'passed' or 'failed'.
3.3.5 Department of Environment, technology, and Social Studies, Roskilde University Center, Roskilde

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Profile

The Department of Environment, technology, and Social Studies at Roskilde University has “the production-borne interrelation between nature and society” as the thematic core. The Department has a long-standing record on interdisciplinary research and education in the field of environment and production. Environmental problems are seen in terms of empirical, technological and manufacturer/consumer behaviour aspects, and they are conceptualised in a holistic and relational manner.

The research activities at the Department include joint and
individual programmes on a national and international basis and are organised within seven Research Areas:

- Environmental Management - Assessment and Regulation;
- Energy and the Environment;
- Integrated and Holistic Industrial Strategies;
- Environmental Toxicology and Genotoxicology;
- The New Enterprise - Working Life, Sustainable Development and Democracy;
- Planning of Nature and Resources;
- Food Production and Living Conditions.

**Education**

The Department undertakes training of graduates and undergraduates in technological and social aspects of planning to enable them to work in the private as well as the public sector with tasks related to the planning of production and the environment. The students graduate with the degree in Technological and Socio-economic Planning. The staff at the Department covers natural, technical and social sciences.
CHAPTER 3. INSTITUTIONAL INFORMATION

The Department offers courses and supervision in two Bachelor’s courses and graduate studies in Technological and Socio-Economic Planning. The central perspective of these programmes is the study of the development of production and the consequences for nature and society. The theories and methods of social science, science, and technological sciences are applied when working with problems within this field. Furthermore, the purpose of the programme is to give the students a problem-oriented, scientific foundation to their study, which will enable them to deal with planning tasks from a socio-technological perspective. This will prepare them for work in planning, scientific research and teaching.

The central element in the study programme is project work. Normally, project work is organised in groups, but the students have the possibility to study on an individual basis.

The study programmes in Technological and Socio-Economic Planning lead to a bachelor’s degree in science (Bachelor of Science) or in social science (Bachelor of Arts) after three years of study. Approximately 90 bachelor’s courses continue with graduate studies that after two years lead to a Master’s degree in Technological and Socio-Economic Planning (M.Tech.Soc.). Furthermore, there is a six-month optional in-job-training period in the middle of the graduate studies.

The bachelor’s courses start with a two-year course at the Basic Studies Programme at Roskilde University in science, social science or humanities, before entering the study pro-
grammes in the superstructure. Two years of basic studies in science, combined with a one-year course in the superstructure at the Department, leads to a bachelor’s degree in science. Two years of basic studies in social science or humanities combined with a one-year course in the superstructure at the Department lead to a bachelor’s degree in social science.

These study programmes can be combined with other studies offered at Roskilde University (International Development Studies, Business Economics, and Adult Education).

The Department offers, moreover, courses and supervision in the Natural Sciences Basic Studies and Social Sciences Basic Studies and in the bachelor courses and graduate studies in Technological and Socio-Economic Planning.

The PhD degree

Training of PhD students also takes place at the Department. The PhD students at the Department are attached to one of two PhD networks:

- Environmental Science

  Researcher education in Environmental Science at the Department is based on co-operation between a number of the departments at Roskilde University (Department of Life Sciences and Chemistry, Department of Geography and International Development Studies and Depart-
ment of Environment, technology, and Social Studies) and some Government research institutes and educational institutions outside of the university. The objective of the programme is to elaborate the knowledge acquired by PhD students in their primary degrees and in any subsequent job. The aim is, moreover, to qualify the PhD student to carry out research at a high level of scholarship and to co-operate with other researchers in conducting cross-disciplinary analyses of environmental problems.

- the Study of Technological Change

Researcher education in technology and socio-economics at the Department is linked to the PhD Network on the Study of Technological Change. The Network was established in 1991 between departments of the Universities of Aalborg and Roskilde, the Technical University of Denmark and the Copenhagen Business School. The purpose of the network is to co-ordinate and to promote co-operation between the PhD programmes in the Technology/Society field at the different institutions in order to obtain better opportunities for the PhD students and higher standards for the PhD programmes.

PhD activities of the different network institutions are co-ordinated by the network. PhD courses at one unit are available to every PhD student connected to the network.
Each institution has its own international network, the activities of which are communicated to the PhD students in the PhD Network on the Study of Technological Change. The network has developed three types of regular courses for PhD students: basic courses, specialised courses and quality workshops.

3.4 Finland

3.4.1 Group for Technology Studies

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Profile

The Group for Technology Studies of VTT, the Technical Research Centre of Finland, was founded in 1992 to advance social and economic understanding of the development and use of
technologies. The aim of the Group is both to strengthen knowledge bases and to facilitate dialogues for decision-making on technology issues in public and private organisations.

The Group concentrates on the preparation of technology policy and on the management of technology in companies and public administration. It provides contract research services and initiates its own research projects. The contract research services include targeted inquiries as well as evaluation, technology foresight and technology assessment projects.

The group has 15 researchers and 5 associated researchers.

**Research Areas and Projects in 1997**

**Industrial Renewal**

The projects within this research area aim to interpret the recent restructuring of Finnish industry from the grassroots level. In 1997 the Group was involved in three major projects falling within this research area. The studies have been financed by the Technology Development Centre of Finland and the European Commission.

**New Services, Networks and Technologies in Health Care**

Development of health care services and supporting technologies cannot be separated from the shaping of the market and its institutional context. The Group’s research focuses on interdependencies between actors and on the rules governing their co-operation and competition. The group has identified
key actors setting conditions for the development and diffusion of self-care technologies and telemedicine. By describing the needs, interests and visions of key actors, they strive to map common ground for their co-operation.

**Evaluation and Development of Technology Policy Instruments**

External evaluations are used as instruments in developing and controlling technology policy measures. They can be focused on an individual technology policy measure or programme, or cover different measures with the same function. All of the measures have goals of their own, and therefore also evaluations must be tailored. A traditional way to complete an evaluation is to compare the results of a programme with the goals set for it. In modern evaluations wider impact analysis and assessment are required. Different policy measures must also be considered in the context of the R&D and innovation activities and infrastructure.

**Technology Assessment and Technology Foresight**

The Group’s research focuses on the analysis of emerging technologies from the perspectives of business potential, acquisition and risk assessment, whereby techno-economic analyses are supplemented by a clarification of societal impacts and regulatory concerns. In their broadest sense, these different elements are combined in the ongoing work for the Subcommittee on Technology Assessment, set up in December 1996 by the Committee on the Future of the Finnish Parliament.
The expectations of firms for the exploitation of emerging technologies have been at the centre of the foresight activities initiated in co-operation with industrial federations. The Group has also given occasional training sessions to firms and research institutes on the use of foresight as a tool for technology planning.

International Collaboration in Research and Development

International research collaboration has generally increased in recent decades. Intergovernmental programmes to promote international collaboration have been among the factors which have furthered this development. The Group's research aims at improving our understanding of the significance and impacts of various European collaboration programmes compared with each other and with international research collaboration generally. Finnish membership of the European Union since the beginning of 1995 has increased the relative importance of EU framework programmes in terms of visibility and participation frequency.
3.5 France

3.5.1 Bureau d’Economie Théorique et Appliquée, Strasbourg

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<tr>
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Profile

The Bureau d’Economie Théorique et Appliquée is a research laboratory belonging to University Louis Pasteur (ULP) and associated with the French Research Council CNRS.

BETA, which was created in 1972 within Universit Louis Pasteur and became an "Associated Unit" of CNRS in 1985, is a research laboratory in economics and management. It consists of some 60 researchers (including doctoral students) covering areas of investigation which range from microeconomic theory
to the history of economic thought, and from the methodology of theoretical modelling to field work. Despite this large thematic and methodological variety, which entails in particular structuring the laboratory along precise research programmes, BETA does not lack consistency and its researchers traditionally are often active in several programmes or collaborate on an ad hoc basis on projects which are only remotely connected with their main fields of research.

BETA has a total of 17 research programmes organised in six "research operations". These programmes have strong interactions, including programmes belonging to two different operations, but they deal with separate research topics, each involving a specific team often with its own research seminar.

The bureau has 39 researchers, over fifty doctoral students and also contract researchers, giving a total of some 140 members of staff.

**Contract research and international collaboration**

Contract research is well developed; the different programmes are affected in varying proportions, a large part concerning operations C, D and E, i.e. the field of analysis of economic and technological change (economics of innovation, technology management, development of qualifications and employment, etc.).

BETA has numerous international contacts, involving al-
most all research operations. To mention only a few: in formalised economics collaboration with the CORE (Louvain, B) and ZEW (Mannheim, D); in economics of innovation with MERIT (Maastricht, NL), ISI-FhG (Karlsruhe, D), SPRU (Brighton, UK). Collaboration with non-European institutions such as Tokyo University in Japan and the University of Virginia in Charlottesville (USA) has been established on a regular basis both in the fields of research and teaching.

3.5.2 Centre of Science, Technology and Society, CNAM, Paris

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Profile

The STS centre aims to provide training and practical courses for engineering students. In line with the mission of the CNAM,
the centre is at the interface of professional and industrial interests and the most recent developments in scientific and technological research. It bridges the gap between the sciences and the social sciences, and gives added value to the training of engineering students.

The centre benefits from the exceptional environment provided by the CNAM, including the Laboratory of Econometrics, the Department of Labour and Enterprise, the Documentation Centre of the History of Technology, the Museum of the History of Technology, and all the science chairs at the Conservatoire.

The CNAM provides comprehensive study programmes designed to cater for the needs of adults who have already begun their professional careers in a wide variety of occupations. It is a public institution of higher education under the supervision of the French Ministry of Higher Education and Research.

In keeping with its mission to promote professional and social advancement, the CNAM makes its educational programmes accessible to all, regardless of their backgrounds. It gives adults the opportunity to expand their knowledge, learn about new disciplines, resume studies they have had to interrupt, improve their social status, or train for a new career. A student at the CNAM is as likely to meet with skilled technicians, top-grade engineers, or businessmen and women, as with deep-sea fishermen or diplomats...

The study of the interactions between technological change,
scientific research, economic growth, and political and social transformations, are the subject of studies conducted by the STS Centre in close co-operation with scientists, historians, economists and sociologists. This research also concerns the study of the scientific community, the history of technology, the politics of technological innovation, as well as the economic, social, and environmental evaluation of current technological change (information technology, telecommunication, biotechnology, amongst others), public participation in decisions concerning science and technology, science and the military, and others.

The Centre collaborates with a host of other teams, both in France and abroad.

Education

The centre’s educational programmes are meant both for CNAM students (future engineers, scientists, or economists already engaged in professional life), and for researchers who wish to update or increase their knowledge from the point of view of their present involvement in economic and social development.

Courses and seminars focus on:

- Technology and society
- Research management and technological strategies
CHAPTER 3. INSTITUTIONAL INFORMATION

- Socio-economic aspects of space technology
- Economics of technical change
- Decision-making methodologies
- Prospective methods and strategic analysis
- Social history of contemporary media
- Economics of networks and telecommunications
- Logistics and transport

Degrees obtainable at the STS Centre are:

- Certificat Général STS / Diplôme
- Professionnel Spécialisé / DEA / Doctorat
- Certificat Général STS
3.5.3 Scientific Management Centre, Paris

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td></td>
<td>Ecole des Mines, Paris</td>
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<tr>
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Profile

The mission of the Scientific Management Centre (CGS) is to contribute, through research and education, to the development of knowledge on the operation and transformation of organisations. The general thrust of the Centre’s research is based on intervention in industry or in the civil service. In this framework, the main areas currently explored by the Centre are the following:

- Transformation of productive systems: new tools for production management; autonomous teams; integration of manufacturing and support functions; corporate networks.
• Rationalisation of design activities: co-ordination between design, research, methods and production; structuring project teams in terms of product-process; organising the capitalization of technical know-how.

• Human resource management, work organisation, skills: training; classification; reskilling organisations; working hours and conditions; labour relations.

• Modernisation of the public service: contractualisation of relations between services and their supervisory authorities; new management control and incentive mechanisms; taking into account customer requirements in planning supply.

• Developments in the Health sector: management training for medical staff; auditing and evaluation; distribution of budgetary allocations among hospitals and medical disciplines.

Research at the CGS is focused on the origins and effects of formalised methods designed either to provide actors with incentives, to evaluate their performance, or to specify and coordinate their respective tasks. These methods can be classified under the generic term "management tools". It has been established that, in stable organisations, actors' behaviour is often largely determined by management tools and, in particular, by
the quantified systems set up to evaluate their activities. When juxtaposed, these different management tools, each inducing a logic of local behaviour among the actors, result in global inconsistencies unforeseen by the "architects" of the systems.

In a dynamic context management tools can no longer be analysed solely from the viewpoint of their role in stabilising behaviour, isolated from the development of know-how. This development spawns new management tools and especially new uses for them which, in turn, become knowledge tools. It is then necessary to propose a typology of know-how, to find the organisational factors of its development and distribution, and to study the development phases of new management tools or the transposition of tools existing in fields other than those in which they originated.

The CGS's "research-intervention" approach requires a request for assistance in solving problems from at least a part of the members of the organisation concerned; as a result research is, to a certain degree, oriented downstream. Changes in types of demand are a stimulus for research, providing new challenges, for example in those organisations in which management tools seem to be largely absent (museums, research centres, law courts). The aim is, by means of this often abundant research material, to identify consistencies in the functioning of organisations, and to devise interpretative theoretical frameworks.
CHAPTER 3. INSTITUTIONAL INFORMATION

Education

The Centre is responsible for three of the academic courses offered by the Ecole des Mines de Paris (EMP)- Scientific Management, Design Engineering and Production Systems - as well as for lectures on Micro-economics, Accounting, Cost Evaluation, Operations Research, Statistics, and Production Systems. It is furthermore involved in the training of engineers from the Corps des Mines, and in various ongoing education programmes both in France and abroad. Finally, within the Doctoral College of the EMP, PhD studies in Engineering and Management are attached to the CGS.

National and international collaboration

The CGS maintains a network of relations with other academic and research institutions: Universit Paris Dauphine and the Ecole Polytechnique - with whom it runs the DEA (Master’s) course in Scientific Management Methods -, the Ecole des Telecoms and Ecole des Ponts, the INAPG (Institut National Agronomique de Paris-Grignon ), and the ENS de Cachan (Ecole Nationale Suprieure de Cachan ), among others. At the international level it has close contact with the Centre for Corporate Strategy and Change at Warwick University, the Institute for Management Information and Technology in Stockholm, and the COST A3 network.
Multidisciplinary exchange has grown, with the CGS’s involvement in the organisation of a Spring School in Economics and Management, its incorporation into a CNRS (Centre National de la Recherche Scientifique) Research Group (FROG) comprising management scientists, economists and sociologists, its participation in seminars and colloquiums organised by the CERNA (Centre d’Economie des Ressources Naturelles) and the CSI (Centre de Sociologie de l’Innovation) and its membership of the CNRS task force ”Pratiques et Métiers de la Conception” (Design Practices and Professions). Inviting researchers from various disciplines to the doctoral seminar meetings has also provided an opportunity for fruitful exchange.

The Centre is also active internationally; in particular it has participated in the International Strategic Management Association conference, seminars in Philadelphia and Montreal on the quality of health and tomorrow’s hospital, it has presented papers at several conferences abroad on the recyclability of vehicles, it has a seat on the scientific committee of the international journal Systèmes d’Information et Management, and it has had an article published in the International Encyclopaedia of Business and Management. Translated publications (a book and research handbook) have been disseminated to selected researchers abroad and use of the Web is currently being organised.
3.5.4 Centre de Sociologie de l’Innovation, Paris

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<tr>
<th>Name</th>
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<tbody>
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Profile

Created almost thirty years ago in 1967, the CSI has shifted its research interests several times. Beginning with the organisation of high-tech industries, and then moving on to the sociology of science, law and the media, it has redefined its own topics as a result of its earlier studies and also because of its unique assets: the training of its staff in both social and natural sciences, the close link with industry and, thirdly, the large weight given to contract research with specific clients, a powerful incentive often lacking in a purely academic environment. The shifts in research interests have resulted in four relatively autonomous areas:

- socio-technical analysis of innovations and industrial
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... projects;

- anthropology of laboratories and research organisms;

- evaluation of the policies of scientific research and development;

- analysis of cultural goods.

But these four areas are in fact criss-crossed by questions of method and theory that are shared by all members of the Centre and that constitute most of its original contribution to the social sciences. Without abandoning its traditional areas of excellence, the Centre has explored new fields at the borderline between disciplines where the organisation of the market is clearly being redefined: environment, service industries, laws and standards, health, food and tastes.

These new topics are studied according to new questions common to the Centre as a whole:

- how are behaviours, tastes, mores and demeanors, and subjectivity in general formed by technical set-ups?

- how is the intervention of the State redefined around the concept of collective goods and how does this redefinition modify the connection between local and transnational levels?
• how can hybrids of law, politics, science, technology, and economics be monitored ("followed"), and what theory can explain their different mediations or forms of co-ordination?

In recent years, the Centre has been moving to new themes. It tries to capitalise on the earlier work by writing textbooks, setting up training courses and producing readers of topical material; this will be done in socio-economics of innovation, science policy and the anthropology of science. On the more theoretical front, the effort will be to redefine the "actor-network theory" which played an important role in science studies, and is now used also to differentiate modes of co-ordination, or regimes of mediations.

As regards internal organisation, the CSI is redefining the role of its junior staff to give it more responsibility and leeway.

More generally, the shift toward the analysis of service activities, intermediaries and associations will be expanded and deepened. These areas are excellent focal points for visualising the unfolding of the new forms of organisation of markets that seemed to be moving away from the supply of products and technical networks into a different regime where usage and services are supplied as global and integrated packages. The emphasis will be put on how economic agents codify and standardise the description of their services, the work done on defining the demand, the ways through which the future user is rep-
resented and how the many adjustments between supply and demand are carried over.

3.5.5 CRRM, Marseille

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<tr>
<td>Address</td>
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<td>Contact Person</td>
<td>Professor H. Dou</td>
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Profile

The CRRM was set up in 1978 in the Chemistry Department at the University of Aix-Marseille III in the St Jrme Research Centre by Henri Dou and Parina Hassanaly. At that time HD was Director of Research at the CNRS and PH Assistant in Organic Chemistry. The aim was to perform various types of online research for the scientific community. At that time the subject was quite new, and the potential of this large stock of information was quite well understood by the CRRM.

The CNRS provided the start-up funds (1978) to begin online research and this is the reason why it was conducted in
Chemical Abstracts at the beginning. Analysis of the information provided led to several scientific papers providing an insight into the distribution of Registry Numbers, technology analysis and scientific production, scattered in various journals.

But, very rapidly interest in the online systems grew, and the CRRM was involved in various continuing education schemes in this area. The training needs were so great that we created a DU (University Diploma) and later on a DESS in Management of Scientific and Technical Information. These two diplomas were created 13 years ago and are still being awarded today.

In 1989, the fifth development plan in France put the spotlight on the question of Technology Watch and Competitive Intelligence, called in French "Veille Technologique". Because we were already involved in this area we proposed to the Ministry of Education and Research to create in Marseille, at the University of Aix-Marseille III a DEA (equivalent of a Master's degree) in Strategic Information, Technology Watch and Competitive intelligence. This Diploma leads the students to the Ph.D. and is successful today, since many students from Indonesia, Brazil, Tunisia, Morocco follow the course. All the students have a grant either from their Government or from the French Ministry of Co-operation.
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Education

Each year in May, the CRRM organises a week of Workshops and Conferences on Technological Watch & Competitive Intelligence.

The Theses, which are done in the laboratory or in other laboratories affiliated to the DEA, deal with many fundamental aspects of the Methodology of Technology Watch and Competitive Intelligence, either in large or medium-sized companies. Other aspects dealing with the development of various types of software to analyse information automatically are a large part of different Theses. The aspect of the methodology of these analysis are also considered and we have developed for instance a block seriation operating successfully on PC. The patents are, among other information sources widely used.

- Post-graduation in Competitive Intelligence and Technology Watch (DEA Bac+5)

  Access : All scientific graduates, engineers, tests for others. Can be completed in two years (continuing education).

- PhD in Scientific Information (Competitive Intelligence and Technology Watch) (Phd)

  Access : Post-graduates in Competitive Intelligence and Technological Watch
CHAPTER 3. INSTITUTIONAL INFORMATION

Collaboration

The contacts and collaborations with various industries are made through research contracts, probationary periods for students and Ph.Ds. sponsored by the Ministry of Education and Research and by industry. (CIFRE)

3.5.6 Groupe d’Etude et de Recherche sur la Science, Strasbourg

<table>
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<tr>
<th>Name</th>
<th>GERSULP Groupe d’Etude et de Recherche sur la Science de l’Université Louis Pasteur</th>
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Profile

GERSULP is an interdisciplinary research centre aiming at studying problems of the social, political, economic and cultural integration of sciences and technology in society. Created in 1973 it is located at the science university - Universit
Louis Pasteur - in Strasbourg. It regroups a large number of researchers from different disciplinary backgrounds. Since 1993 GERSULP is affiliated with the CNRS through the Unit Mixte de Recherche 9949 (presently being restructured).

In recent years scientific expertise has been acquired through a large variety of research projects mainly in three areas.

1. The first rather general theme could be labelled "Formation of scientific fields and their social and intellectual organisation". This heading relates more precisely to questions on the processes of creation and institutionalisation of new research fields, on the role of science policy, on the dynamics of the formation of research groups (actors and networks), but also on the mechanisms of construction, transformation or maintenance of boundaries within the sciences. Here projects like the history of science and scientific institutions in Alsace from 1850 to the present (HISA project) in which members of GERSULP are participating, and the constitution of AIDS research as a scientific field or a comparative study of the developments of ethology in Germany, the UK and France since the 1930s could be mentioned.

2. The second focus of interest is directed towards "the sciences and technology as practice and culture". This topic
embraces research on communication within the sciences (e.g. changes caused through the introduction of new media such as the Internet, modelling scientific communication as a specific case of social communication), on representational aspects in the sciences (e.g. the use of images in the community of mathematicians), on the processes of knowledge production and learning, on the development and the functions of scientific practices in the laboratory, but also on the mechanisms at work in the construction of consensus and conventions.

3. Finally, a large number of research projects have been directed towards the study of the interface between science/technology and society. This area has been very important at GERSULP since the beginning, especially with regard to the popularisation of science, but also to the public uptake of science and technology in areas of food controversies (e.g. irradiation of food, information on food,...) or medical information (e.g. AIDS and media,...). This embraces the important question of construction of scientific expertise in the public domain as well as the complex relationship between scientific development and the ethics of science and legislation. Finally, the field of communicating science in education has also been broadly investigated.

The unit has 9 permanent staff members.
3.5. FRANCE

Education

Degrees:

DEA (Diplôme d’études approfondies): Histoire économique et sociale des sciences et de la technologie at the Ecole Doctorale Augustin Cournot de l’Université Louis Pasteur - preparatory degree for the doctoral thesis - European Master “Society, Science and Technology in Europe” (ESST) - connected to the DEA; specialisation in the field of Public Understanding of Science (see attached information) - DESS (Diplôme d’études supérieures spécialises): "Communication scientifique et technique" - open only to students with a master in the sciences; oriented towards practical application in science communication - Ph.D.

In the early nineties GERSULP started to run a DEA (equivalent to an M.A.) in the field of STS as well as a DESS, a diploma oriented towards more practical applications in the field of the communication of science and technology.

The research centre participates in the master’s programme of the European Inter-university Association on Society, Science and Technology (ESST). GERSULP is financed by the Université Louis Pasteur, the CNRS, and through contract research by other public and private bodies. So far research has been commissioned among others by the French Ministry of Research and Technology, the Centre National de la Recherche Scientifique (CNRS), the Délégation Générale de la
Recherche Scientifique et Technique (DGRST), the Centre National d’Etudes de Telecommunication (CNET), La Fondation de France, l’Agence Nationale de Recherche sur le SIDA (ANRS), French Ministry of Agriculture, Unesco and the European Community.

**Costs and admission criteria**

The education is free of charge. Only the general inscription fees at university are required (roughly 1500 FF).

The admission criteria vary per degree:

- **DEA:** French Maîtrise or equivalent - Selection of candidates through dossier and interview
- **DESS:** French Maîtrise in Science - selection of candidates through dossier and interview with a short presentation by the candidates
- **European Master:** As DEA + good knowledge of English language
- **Ph.D.:** DEA or equivalent

**International collaboration**

GERSULP participates in international networks:
3.5. FRANCE

- ESST: European Network "European Interuniversity Association on Society, Science and Technology"

- ISHPSSB: International Society for the History, Philosophy and Social Studies of Biology

- PCST: Public Communication of Science and Technology

GESULP co-operates especially with:

- Institute for Philosophy and Social Studies of Science, University of Vienna

- Bureau d’Economie Theorique et Appliquée (BETA), Université Louis Pasteur, Strasbourg

- the institutions members of the ESST network
### 3.5.7 Institut de Droit et Economie de la Firme, Valbonne

<table>
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<tr>
<th>Name</th>
<th>Institut de Droit et Economie de la Firme et de l’Industrie, University Nice Sophia Antipolis</th>
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#### Profile

IDEFI is a federation of research units created in 1994. Its mission is to coordinate research activities in economics, law and management focusing on questions concerning the evolution of firms and industries.

The centre has a staff of 60 researchers.

The IDEFI (Institut de Droit et Economie de la Firme et de l’Industrie) was created in 1994, IDEFI is a federation of four research units (LATAPSES, CREDECO, CRIFP, RODIGE), the first three belonging to the French C.N.R.S.

LATAPSES is a research unit in economics associating the University of Nice Sophia-Antipolis and the French CNRS. The
staff (about 60 scholars) develops research activities in numerous topics such as macro-dynamics, money and finance, industrial economics, economics of innovation, history of economic thought, and environmental issues.

CREDECO is a research unit created in 1993 and affiliated to CNRS. It is devoted to law and legal affairs. Its main research activities are related to topics such as law and competition, property rights, risk and insurance, environment and law, urban planning and law. It has a staff of around 30 scholars.

RODIGE is a management and business science research unit. Its staff (around 40 scholars) is investigating firms’ organisation and strategy, and information and decision-making systems within the firm.

CRIFP is a research unit from the University of Nice Sophia Antipolis. It has around 10 scholars investigating topics such as public finance, fiscal policies, and public management.

Its research themes are:

- the evolution of the enterprise and industrial organisation
- industrial relationships
- the relation between science and industry
- normalisation and certification
- models of the evolution of firms and markets
• forms of "bottom up" coordination and new approaches to industrial policies
• evolution, institutions, innovation and employment
• industrial dynamics and the evolution of employment
• employment policies and entrepreneurial strategies
• risk, responsibility and precaution
• environment, urban life and market regulation
• negotiated law and environmental protection
• industrial investment, risk and insurance issues
• forms and means of local development
• innovation, growth and geographical economies
• the evolution of regulation and of management institutions
• the development of financial instruments
• control of bank activities and financial risk
• the formation of new juridical tools and financial instruments.
Education

Degrees: Master and PhD in economy, law and management.

The laboratories comprising IDEFI provide for Master and PhD degrees in economy, law (especially economic law) and management. The teams are also involved in the professional formation organised by the University of Nice-Sophia Antipolis in these three disciplines.

More specifically, the following degrees can be obtained:

- DEA in Industrial organization and economic dynamics
- DEA in Economic and business law
- DEA in management sciences

Costs and admission criteria

The admission criteria and costs follow the rules of the university.

International collaboration

IDEFI is an active partner in French and E.U. research programmes. It is involved in research projects associating numerous research units from the whole of Europe. It current has partnerships with institutions such as SPRU, MERIT, and the universities of Roma, Siena, Torino.
3.5.8 Economics and sociology of R&D, Grenoble

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Profile

The mission of the SERD (Economics and Sociology of R&D) research team is to study the organisation of research and development and more generally technological innovation. These themes are mainly analysed in connection with INRA fields of interest, such as biotechnology, agribusiness and agriculture. The team is interdisciplinary, as its name shows. Its research work revolves around three themes: innovation, rules and dynamics of organisations, risk and decision, economics of knowledge. Those three themes are organised around application areas: genetic resources, biotechnology, laboratory studies, food safety, innovation inside sectors with low inten-
The SERD team now consists of 9 researchers and 5 PhD students. Since its creation in 1989, it has had a fairly high growth rate.

Created in 1989, Unit SERD of laboratory INRA of Grenoble, conducts its research incorporating theoretical and empirical approaches, in areas particularly marked by dynamic phenomena and strategic interaction.

At present, the work revolves around two themes: the study of biodiversity and the organisation of research and development (R&D).

The maintenance of genetic heritage and the conservation of genetic diversity, necessary for scientific progress and plant breeding, involves an economic evaluation of the heritage available. The works of economists, realised in collaboration with geneticists, tend to define solutions permitting the maintenance of diversity at an acceptable cost while the corresponding biological methods for supporting diversity are still in the process of being developed. The models on which SERD works take into account not only scientific and technical uncertainty but also the geopolitical stakes, emphasised for instance at the Rio Conference.

The analysis of the organisation of R&D is carried out at various levels - at the level of the firm and the laboratory, and at the level of the network in which public laboratories, private laboratories, funding institutions, and the government participate, in order to examine the processes of innovation at the core
of networks, and define the best modes of organisation. The co-ordination of research activities carried out within the firm or within innovation networks plays a central role in the production and diffusion of scientific knowledge and techniques. Applied to the biotechnology sectors and the seed industry, the research conducted by SERD focuses on the links between the application of research results, the modes of organisation and co-ordination, the possibilities for learning and the construction of core competence of the various actors. Different tools have been put to use: monographic studies, models, research followed up by action, etc.

While going to the heart of the matter of pertinent theoretical questions, the research output of the members consists of publications in national and international reviews, and also presents concrete solutions to the problems posed by their partners.

Education

Degrees: DEA, PhD

SERD teaching is complementary with respect to its research. Teaching is done mostly at the MA/MsC and PhD levels. At this moment SERD members teach in two different MA courses in Economics. A reform of one of these MA courses, which should become operational in 1999/2000, will result in a shift towards industrial economics, within which technologi-
cal innovation, firm theories and evolutionary theories will be treated. Moreover, SERD will collaborate with the European Master in the Economics of Innovation organised by BETA (Strasbourg).

PhD students work on projects ranging from innovation in the agro-food industry, the knowledge bases of small firms in biotechnology, the career profiles of biology PhDs, the risks involved in the introduction of transgenic colza, and the empirical analysis and modelling of technological trajectories. We encourage PhD students and post-doctoral fellows from other centres to come to SERD either for the complete duration of their degree or for part of it, for example by means of co-supervision.

There is no course work requirement for a PhD, but students are requested to participate in a number of activities, such as a general culture seminar, short training courses in topics such as statistics, software, or particular theoretical developments.

Costs and admission criteria

1,500 French Francs registration fee and at least 1,000 FF social insurance per year.

For the PhD degree applicants must have completed an MA course in a relevant discipline.
International collaboration

Aware of the need to have a better understanding of the present and future problems of diverse economic agents, SERD has been active in seeking and implementing contracts. SERD has worked with bodies which have recognised the complementarity of the relationship between the nature of fundamental research and the concrete answers required for complex problems confronted by these bodies, in engaging in such activity. SERD has developed collaborations with:

- Firms: EDF, Limagrain (cofinancing of thesis).
- Institutions: FNEGE, GREG, INRA, CETIOM, ITCF
- Governmental Organizations: Ministry of Higher Education and Research, CEE.

SERD is moreover linked with other Academic Institutions:

- Teaching at: the University of Pierre Mendès France, INPG (Grenoble), INA-PG, at ENGREF, University Paris IX Dauphine (Paris) and ENESAD (Dijon).
- Inter-institutional agreements within France with: BETA (Strasbourg), CRISTO (Grenoble), CSI (Paris), INA-PG (Paris)
Agreements abroad with: DPCT/UNICAMP (Brazil), University of Modena (Italy), IIM-B (India), Cornell University (USA), University of Manchester (UK), SPRU-University of Sussex (UK).

3.5.9 Institut de Recherche sur les Fondements et les Enjeux des Sciences et des Techniques, Strasbourg

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<tr>
<th>Name</th>
<th>Institut de Recherche sur les Fondements et les Enjeux des Sciences et des Techniques University Louis Pasteur</th>
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<td>Contact Person</td>
<td>William Shea</td>
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</tbody>
</table>

Profile

The research themes are as follows:

- epistemology of the life and health sciences,
CHAPTER 3. INSTITUTIONAL INFORMATION

- the history of medicine,
- the history and epistemology of mathematics and physics,
- the edition of the works of Henri Poincaré
- science, technology, and society

3.6 Germany

3.6.1 Europäische Akademie zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen

<table>
<thead>
<tr>
<th>Name</th>
<th>Europäische Akademie zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen</th>
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3.6.2 Institute for Systems and Innovation Research, Karlsruhe

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<tr>
<th>Name</th>
<th>Fraunhofer Institute for Systems and Innovation Research</th>
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Profile

The Fraunhofer Institute for Systems and Innovation Research ISI is a research establishment of the Fraunhofer-Society (FhG), a non-profit organisation carrying out applied research. The ISI was founded in 1972 in order to extend the range of scientific and technological disciplines covered by the Fraunhofer-Gesellschaft at the sensitive interface of technology, industry and society. The Institute investigates technical developments, their market potential and their effects in respect of energy requirements and consumption, the environment, production, communications and biotechnology. Its activities in research and consulting enable the ISI to draw early attention to the opportunities, risks and obstacles involved in new technical de-
velopments, to act in support of the necessary adjustment processes, and to contribute to innovations.

The Institute develops concepts for appropriate implementation of new technologies, and organises pilot projects. Decision-making processes in government and industry, both in Germany and abroad, are given a more solid foundation through in-depth assessments of promising new methods, appraisals of research priorities, and scientific support of political programmes of promoting new technologies.

Since 1994, the Institute has been operating the "Economy of Innovations" research department attached to the Technical University Bergakademie at Freiberg in Saxony, and, since 1996, the Agency for Biotechnology of the Land of Baden-Württemberg.

Research focuses especially on:

- Innovation Services and Regional Development
- Technology Analysis and Innovation Strategies
- Innovations in Biotechnology
- Innovations in Production
- Information and Communication Systems
- Energy technology, and Energy Policy
• Environmental Technology and Environmental Economics

The ISI employs a full-time staff of 120, of whom 70 are scientists working in a variety of disciplines (natural sciences, engineering, economics and social sciences).

Education

The institute has no independent education program. Degrees can only be obtained with adjacent universities such as Karlsruhe (Germany), Strasbourg (France), Freiberg (East Germany).

Admission criteria are negotiated in each individual case. This also holds for the costs.

International collaboration and communication

The Institute’s facilities for the procuring and processing of project-related data and information include a specialist information service with approximately 26,000 books, 240 specialist journals and 30 CD-ROM databases as well as specialist archives of the departments, for instance on technology development, research statistics and patent statistics, new production and communication technologies, energy economics and environment.
Since 1994, ISI has been running a joint Innovation Economics Research Unit in Freiberg (Saxony) together with Freiberg’s Technical University. In 1996, at the request of the Baden-Württemberg Land Government, ISI founded the Baden-Württemberg Biotechnology Agency.

ISI’s present work includes research projects commissioned by various well-known commercial and industrial enterprises (including Daimler-Benz, German Telecom, Siemens, the Deutscher Sparkassen und Giroverband, the Deutsche Bank, the Commerzbank, the Westdeutsche Landesbank), societies for the promotion of industry, and utilities (including in Düsseldorf, Mannheim and Saarbrücken). ISI’s clients in the public sector include government agencies, universities, research centres and private foundations.

Since its foundation, the Institute has worked in close cooperation with partners in other countries both in and outside Europe. ISI participates in an international innovation network known as the Six Countries Programme of specialists from research institutes and ministries of the main western specialised countries who have been meeting regularly since 1976. Recently, expert networks have also been formed on evaluation research and science and technology policy planning in the framework of the European Union. ISI was also co-founder of the International R&D Dynamics Network, formed in 1984, and is a member of the European Network on Energy Economics Research (ENER) with energy economics institutes in 10 Euro-
pean countries; this network is also supported by the European Union.

### 3.6.3 Institute for Technology Assessment and Systems Analysis, Karlsruhe

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<td>Margareta Kinsch</td>
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</table>

**Profile**

The Institute for Technology Assessment and Systems Analysis performs scientific work in the areas of technology assessment, materials flow analysis and socio-economic environmental research. The common characteristics of all ITAS work are a research approach rooted in systems analysis and interdisciplinary co-operation between natural scientists, engineers, economists and social scientists.
Activities

In the area "technology assessment" research is performed on:

- the potential of new scientific and technological developments and the connected societal, economic and ecological opportunities,
- the legal, economic and social framework conditions of the realisation and implementation of scientific and technological developments, and
- the potential positive and negative impacts of the future use of new scientific and technological developments,

with the aim of identifying possibilities for an increased exploitation of the opportunities of technology application while avoiding or minimising its risks.

Another major focus is conceptual work on technology assessment and related approaches for analysis, such as risk assessment (identification, effects and appraisal of technology-induced risks), environmental impact assessment and so-called regulation impact assessment.

ITAS is also involved in the production and maintenance of an infrastructure for technology assessment in Germany. It runs a database on technology assessment and publishes a quarterly newsletter "TA-Datenbank-Nachrichten". ITAS has conducted
a feasibility study for a European TA Infrastructure on behalf of the European Commission.

Special units

ITAS runs two special organisational units: the German Parliament’s Office of Technology Assessment (TAB) and the Environmental Research Information Unit.

TAB was established in 1990 under a contract from German Parliament with the goal of contributing toward the improvement of information behind parliamentary decision-making on science and technology policy. Among TAB’s tasks are the conception and performance of technology assessment projects, and - to prepare and supplement these - the observation and analysis of important scientific and technological trends and their connected societal developments (monitoring).

The main focus of current work of the Environmental Research Information Unit is on analysis and policy advice concerning questions of global environmental change. In this context the Information Unit for Environmental Research works on problems of operationalising the concept of "Sustainable Development" and supports the BMBF in questions relating to the implementation of the UN Framework Convention on Climate Change (UNFCCC)
3.6.4 Institute for Science and Technology Studies, Bielefeld

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<th>Name</th>
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Profile

The Institute for Science and Technology Studies studies the development of science and technology as well as their relationships to society at large. It resides both in the Faculty of History and Philosophy and in the Faculty of Sociology of the University of Bielefeld. Historians, philosophers, scientists and sociologists collaborate in its interdisciplinary research programme. With the establishment of the IWT, the University of Bielefeld was the first research institution in Germany to meet the organisational prerequisites for long-term, interdisciplinary work in the field of science and technology studies. Today, the IWT is recognised as an internationally successful centre of research in
3.6. GERMANY

social, philosophical and historical studies of science and technology.

Special focus is on:

- studies of the validity claims of scientific knowledge, and the conditions under which these truth claims are accepted
- the social and ethical consequences of socio-technical change
- the relationship between science, technology, and society

The research program consists of four parts:

- the analysis of socio-technical innovation
- science indicators and quantitative science studies
- science cultures
- institutional change of science and technology
- theories of scientific and technological knowledge and know-how
- science, policy and the public opinion

The department has 34 researchers and teaching staff.
Education and the Graduate School

Degrees: Diploma, MA or PhD in Sociology, History or Philosophy

In the interfaculty education and research programme “Foundation, structures and consequences of science and technology”, the sociology of science and technology is brought together with the philosophy of science and technology. Problem areas at the interfaces between these specialisations are central.

The relevant disciplines are:

- the sociology of science and technology
- the philosophy of science, science studies and epistemology
- the history of science and technology

The programme does not constitute a separate specialisation but a problem area which can be studied from the angle of various disciplines. The education in this programme aims to understand the process of innovation, the development of science and technology policy and the various cultures in science. The graduate school is meant for researchers in the sciences, the social sciences and the humanities whose perspective is in the area of science and technology policy and management; scientist who wish to get involved in science and technology
planning in the public and private sector; prospective science journalists who wish to focus on the social conditions in which science and technology develop.

The programme entails research colloquia, seminars and workshops on various topics and research themes.

**Costs and admission criteria**

The basic admission criterion for graduate students is a university degree, for the postdoctoral fellows a completed PhD thesis. For the PhD programme a proposal of a research project has to be submitted.

Age does count: graduate students should in general not be older than 28 years, postdocs should preferably be younger than 35 years, with a PhD thesis dating back no more than 3 years.
### 3.6.5 Institut für Soziologie Munich, Munich

<table>
<thead>
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<td>Dipl. Soz Cordula Kropp</td>
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**Profile**

The department’s strong points are the theory of modernisation, risk society, the sociology of environment, and science and technology studies:

- Sociology of computer sciences, alternative medicine, consultancy knowledge
- Social dimensions of the genesis of technology, creativity and innovation Studies
- Environmental studies, mobility studies
A sociology of the ecological crisis still has to be developed. This raises two questions: Why and how? First, the ecological question has, since the eighties, had a high profile in opinion research. At least in Germany, but also in other European countries, the abstraction of the ecological question means an abstraction of important trends in modern society. Second, considering ecological destruction, institutions show substantial deficits in regulation.

The consequence is that even if everybody keeps to the limits, species die out, etc. Third, sociology can contribute its experience concerning the social question to the scientific and political discussion about the ecological question. These are certainly two historically different questions. But it is clear that a lot of discussions tend to reappear and that a similar process of learning is needed. In any case it is also a question of the crisis of institutions and not only of morals or technology. Amongst others, the following topics are covered:

- on the one hand the cultural history of concepts of 'nature', and on the other hand the elaboration of a typology of "gesellschaftliche Naturverhältnisse" of the modern society.
- the question of the social construction of risk and danger (Cultural Theory and discourse analysis)
- sociology of social movements
• the question of ecological conflict in society, that is the outlines and dimensions of an ecologically expanded analysis of social structure

• the conversion of everyday culture in terms of the ecological question

• analyses of institutions, that show the environmental problem as an "Innenweltproblem" of social systems and organisations

• the social and political changes enforced by attempts of regulation

• consequently, questions of sociological theory always come up in discussions.

The different traditions of theories developed mostly around the distribution of wealth - the distribution of goods. The ecological crisis focuses on the question of redefinition or distribution of "bads" (as well as overlapping of both logics of distribution). A frame of concepts has to be developed which includes the proposition that theories of modernisation and of modern societies have to be opened towards the ecological question. Unlike the sociology of the ecological question, the sociology of technology is well established. It deals with:
3.6. GERMANY

- social history of technology and with concepts and theories of technology in the limelight of sociology

- questions of social organisation of the development and employment of technology (including expert groups, ethics commissions, etc.)

- methods and models of technology assessment as well as questions of "technisation" of fields of social action

- sociology of science, science studies and theory of science

- occupational organisation and social status of technologists and engineers

- questions of the development of technology on the stage of reflexive modernisation

Considering the big differences between the various technologies, the focus should be on large technical systems of great ecological relevance (amongst others nuclear technologies, gene technologies, human technologies, information technologies).

Education

The academic year comprises two semesters: The Winter Semester which runs from the first of November to the end of
February, and the Summer Semester which runs from the second of May to the end of July. In between students are expected to write papers, and work independently. Each semester, students can attend at least three sorts of courses that all last 13 to 15 weeks (plus the extra time to write papers):

- **Vorlesungen**: Generally introductory lectures given by professors for 100 to 600 students. Two hours a week, concluded with a written exam; the credit is a so-called "Vorlesungsschein" which one officially needs to be able to attend seminars.

- **Übungen**: A seminar on a wide range of subjects, usually with 10 to 30 student participants and given by lecturers. Two hours a week, usually concluded by writing an individual paper (up to 15 pages) which should be handed in four to eight weeks after the end of term. The credit is the "bungsschein" which students need to be able to attend Hauptseminare" (in the case of Socrates students -who are assumed to be of Master's standard - this requirement is waived). For an example see below.

- **Hauptseminare**: Advanced (but not quite graduate) seminars on specialised subjects, usually with 25 to 50 students and given jointly by a professor and a lecturer. Four hours a week, concluded by writing an individual 25 to 30 page paper term which should be handed in four to
eight weeks after the end of the term. The credit is the "Seminarschein".

Among the courses taught are: theories in sociology in technology, technology and Society, ecology and politics, and environmental sociology.

**International collaboration**

The department collaborates with amongst others:

- the Münchner Projektgruppe für Sozialforschung,
- ISIFO, Institut für sozialwissenschaftliche Information und Forschung,
- the Centre for the Study of Environmental Change, at Lancaster University, and
- the Technische Hochschule Darmstadt, Institut für Soziologie, in Darmstadt.
3.6.6 Max Planck Institute for the Study of Societies, Cologne

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</table>

Profile

The Max Planck Institute for the Study of Societies, a member institute of the Max Planck Society, is devoted to basic research in the social sciences. It was founded in 1985. Its work focuses on the governance of advanced industrial societies in the face of internationalisation and economic globalisation, in particular on the changing roles and capacities of states and other corporate actors under conditions of international interdependence and supranational integration. In the analytical perspective of actor-centred institutionalism, projects at the institute assess multi-level and multi-actor processes of decision-making, negotiation and co-ordination, and apply theory modules of evo-
olutionary dynamics as well as political economy.

The Max Planck Institute is not a university institute. It does provide research positions for doctoral and post-doctoral students but cannot award any academic degree.

Research perspectives

- International and intersectoral comparisons of the functioning of national systems of governance and their response to changed external conditions. In internationally comparative studies, we will try to find out whether national systems that used to be different from one another are in the process of converging into a uniform (or, at least, more uniform) pattern, or whether exogenously induced change is leading to new, but still nationally different (and in this sense "path-dependent") institutional configurations. Are these configurations functional equivalents with no effect on international competitiveness? Or are they assets, or liabilities? The intersectoral comparisons focus on the differences between sectors exposed to international competition and sectors that continue to be protected, as well as on the interactions between these sectors.

- The operation, performance and democratic legitimacy of transnational and supranational governance systems.
Even though they are reducing national capacities to act, such systems are also supposed to perform governance functions the national level can no longer handle effectively. Problems of interest intermediation are of particular interest at this level. As long as the democratic deficit of transnational institutions impedes progress towards majority decision-making, the problem-solving capacity of such institutions will tend to be limited to matters on which a broad consensus can be reached among participating states. Moreover, nationally influential non-state actors and the interests they represent will differ greatly in their capacity to organise and act at the transnational level. What we can expect, therefore, is a characteristic selectivity of interest intermediation in transnational regimes that may differ greatly from the distribution of influence in national governance systems.

- The interplay between the institutions of multilevel governance systems. There is no reason to think that just those functions which are affected by economic competition at the national level will necessarily be dealt with at the transnational level, and vice versa. Instead, there is a possibility of competence gaps, of competence conflicts or of the immobilism of inter-level joint decision traps. But it is also possible that a productive complementarity of competencies will develop that serves to increase
the overall problem-solving capacity of multilevel governance. Which of these possibilities will win out may well depend on the instruments applied. One of our main theoretical concerns will be to develop methods for analysing the compatibility and incompatibility of different types of regulation.

Research areas are:

- Multilevel Problem Solving in European Public Policy
- Regime Competition and Integration in Industrial Relations
- Science and Technology

Research projects

Research projects in the area of science and technology:

- Institutional Linkage between Scientific Research and Users in Comparative Perspective
- European Comparison of Public Research Systems
• The Internet and the Development of Research Computer Networks: An International Comparison from a Governance Perspective

• Cognitive and Organisational Structures in Scientific Research: A Comparison of Nuclear Physics and Information Science

**International collaboration**

Cooperation runs more on an individual basis than on an institutional one. We regularly host many short-term and long-term visitors, and we cooperate with:

• European University Institute, Florence, Italy

• Center for European Studies, Harvard University, Cambridge, Mass., USA
3.6.7 Postgraduate Programme Renewable Energies, Oldenburg

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Profile

The Postgraduate Programme Renewable Energies is an educational activity of the Department of Energy and Semiconductor Research in the Faculty of Physics at Carl von Ossietzky Universität Oldenburg/Germany. It is a one-year MSc course designed for scientists and engineers intending to prepare for professional occupations involving renewable energy technologies, especially in the Third World.
Programme

The increasing importance of renewable energy sources for industrialised and developing nations is well known today. This contrasts the fact that alternative energy technologies, which are well suited to the needs of Third World countries, are available but not widely made use of. One reason for this is that scientists and engineers working in Third World countries have generally not been introduced to the principles and technical methodologies of renewable energy systems.

The Postgraduate Programme Renewable Energy enables scientists and engineers who intend to work in Third World countries to plan and to design energy supply systems based on renewable energy sources, such as solar and wind energy, biomass, hydro power, etc. Another purpose of the programme is knowledge transfer to the academic staffs of universities in the Third World.

Participants study scientific principles of renewable energy use and learn how to combine energy converters and storage components efficiently in a complex supply system. Furthermore, they are encouraged to consider ecological, economic, geographic and cultural aspects and the side effects of the introduction of decentralised energy systems in a real social context.

Topics of the programme are:

- Scientific principles of renewable energy sources
• Technical feasibility of renewable energy systems
• Economic conditions for the use of renewable energy
• Components of small-scale energy-supply systems
• Analysis, simulation, and design of energy supply systems
• Case studies: analysis and design of selected small scale energy supply projects in remote areas
• Contacts with companies and organisations in the field of renewable energy sources
• Experimental work and a thesis on a subject related to the participants' future occupation.

Lectures and seminars are given by PPRE staff members and scientists from the University of Oldenburg with an extensive background of research in fundamentals of renewable energy conversion, application of renewable energy technology, biology, and economy. Furthermore, external experts are invited to hold compact seminars in order to share their practical experiences.

Admission

1. Admission Requirements
The course has been designed for scientists and engineers who have completed at least four years of academic training. Professional experience in the energy sector will be an advantage. Students from developing countries who intend to use their knowledge in energy-related institutions at home are particularly encouraged to apply for the course.

The course language is English. Applicants who are not native speakers must provide a certified proof of their competence, in spoken and written English (minimum TOEFL test score: 550 or ELTS test overall band: 5.5). In addition, basic German is required, but this can be acquired during a language course before the beginning of the postgraduate course.

2. Qualification

Applicants already holding an MSc in the field of renewable energy or even higher qualifications, normally will not be considered for this course.

3. Scholarship

A minimum of DM 15,000 is necessary for living and housing during the 12 months of the course. The University of Oldenburg is not able to offer any scholarships. Therefore, applicants should contact the local
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German embassy, where application forms for a scholarship from the German Academic Exchange Service ("Deutscher Akademischer Austauschdienst" DAAD) are usually available (DAAD application forms are not available at the University of Oldenburg).

As DAAD only awards a limited number of grants (at the moment a maximum of 8-10 scholarships per year are available for this programme), the applicants should also contact other institutions for financial support during their possible stay at the University of Oldenburg. The deadline for applying for a DAAD scholarship is 31 August at the local German embassy and 15 October at the DAAD central office in Bonn/Germany, the year before the course begins.

4. Deadline for Application

Applications for the postgraduate course arriving at the University of Oldenburg later than January 15 cannot be considered. Applications should contain a certified copy of each diploma (including all credits), a written cv and a certified proof of competence in spoken and written English as stated above. Additionally, recommendations from your employer might be included.

Applications have to be sent to the local German embassy (in the case of an application for a DAAD scholarship
your papers have to arrive before 31st August) or directly to the University of Oldenburg (in the case you do NOT apply for a DAAD scholarship).

Inquiries are welcome and should be sent directly to Mr Edu Knagge at the PPRE office by letter, fax, or e-mail.

Information and application forms will be sent on request. In case of unexpected technical problems contact the co-ordinator who is responsible for the co-ordination and administration of the course.

3.6.8 Wissenschaftszentrum Berlin, Berlin

<table>
<thead>
<tr>
<th>Name</th>
<th>Social Science Research Center</th>
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<tbody>
<tr>
<td></td>
<td>Wissenschaftszentrum Berlin</td>
</tr>
<tr>
<td></td>
<td>für Sozialforschung WZB, Berlin</td>
</tr>
<tr>
<td>Address</td>
<td>Reichpietschufer 50</td>
</tr>
<tr>
<td></td>
<td>D-10785 Berlin, Germany</td>
</tr>
<tr>
<td>Phone</td>
<td>+49 - 30 - 25 49 1 - 0</td>
</tr>
<tr>
<td>Fax</td>
<td>+49 - 30 - 25 49 16 84</td>
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<tr>
<td>Teletex</td>
<td>3 08 897 wzb d</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:presse@medea.wz-berlin.de">presse@medea.wz-berlin.de</a></td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Burckhard Wiebe</td>
</tr>
</tbody>
</table>
3.6. GERMANY

Profile

Basic social science research is conducted at the WZB in selected problem areas under the general theme of "Developmental Trends, Problems of Adaptation, and Possibilities for Innovation in Modern Democratic Societies." The interlinkage of basic research and practical relevance is specifically expressed in the setting of the tasks of the research units, research groups, and research professorships. They embody the theoretical and conceptual perspectives of the various disciplines within the social sciences and, as a rule, are synthesised in research areas that describe interdisciplinary dimensions relating to a social problem area. WZB research is focused on issues that the decision-making community and society at large have a special interest in solving.

Nevertheless, this work looks beyond immediate needs. It is designed with a long-term perspective. Integrated into the wider contexts of scientific discussion and closely linked to scientific activity in the universities and other research institutions, WZB’s research work contributes to dealing with practical problems as well as to further developing theory. It is characteristic of the largely empirical research work of the WZB, whose results are communicated to both scientific and policy-making communities, that in addition to its multidisciplinary approach it has an internationally comparative dimension. At first this centred almost exclusively on western industrialised
(OECD) countries, but recently it has focused increasingly on the European Union and is extending more and more towards central and eastern European countries to analyse the transformation processes there.

**Research areas**

- Research Area Labour Market and Employment:
- Research Area Technology - Work - Environment
- Research Area Social Change, Institutions and Mediating Processes
- Research Area Market Processes and Corporate Development

**Organization and Technology**

Work in this area focuses on the processes by which technologies are developed, specifically on how social and industrial factors influence decisions on technologies. The first generation of projects in this unit examined the innovation processes relating to writing technologies and engine technologies for motor vehicles. In addition, basic theoretical and conceptual work has been conducted to understand how organisational culture and visions shape organisational perceptions, policies, and products.
Results from this first generation of projects contributed to the further elaboration of the conceptual foundations and suggested new fields of empirical research for the second, current generation of projects.

Attention has shifted from the historical reconstruction of processes that led to existing technologies towards the study of technologies as they emerge. The aim is to understand how early usage patterns and habits influence the form and design of new technologies.

Emphasis has moved from a relatively static view of organisational culture toward more dynamic models of organisational learning in order to understand organisational behaviour in diverse and turbulent environments.

Increased attention is drawn to factors that transcend organisations, such as visions of technologies, which can affect the direction of technological developments or may trigger the emergence of new technologies. The work in the second generation of projects in this research unit builds on the first generation by focusing on information, communication, and transport technologies. In addition, projects are under way to explore issues surrounding the development of biotechnology, especially genetically engineered foods, and research on the human genome.

- Project Area: Mobility

This research investigates the issues whether the tradi-
tional vision of the motor car is being perpetuated largely as it is or whether it is being modernised and restabilised following critical examination. In the context of new policy restrictions and altered practices, some processes of the erosion of the vision that have been visible in recent years have continued, leading automobile companies to change conceptually from automotive manufactures into suppliers of mobility services.

- Project Area: The Internet as a Cultural Space

The Internet forms a new kind of socio-technical space. Drawing on an ethnographical approach, the rules, habits, and institutions that provide a framework for this space are studied. Cultural patterns of meaning, the political dimension, and the structure of communicational spaces are explored by means of four case studies, the basic hypothesis being that social and technical elements of the Internet are interdependent phenomena. Among other resources, the project group operates a World Wide Web server, a news server, and Multi-User Dungeon (MUD).

- Project Area: Organizational Learning

Since 1994 the research unit has been co-ordinating an international and interdisciplinary network on Organisational Learning funded by the Gottlieb Daimler and Karl Benz Foundation. A comprehensive handbook and an an-
notated bibliography are being prepared. Projects within the unit focus on processes and agents of organisational learning, such as strategies for acquiring new knowledge and dealing with memory loss in downsizing; roles that consultants play in promoting and hindering learning in client organisations; and factors influencing the ability of international companies to learn from expatriate managers.

3.6.9 Centre for Technology and Society, TU Berlin, Berlin

<table>
<thead>
<tr>
<th>Name</th>
<th>Zentrum Technik und Gesellschaft Technische Universität Berlin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Hardenbergstrae 4-5, Sekr. HAD 38 D- 10623 Berlin</td>
</tr>
<tr>
<td>Phone</td>
<td>49 +30 / 314 - 23665</td>
</tr>
<tr>
<td>Fax</td>
<td>49 +30 / 314 - 21406</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:ztg@ztg.tu-berlin.de">ztg@ztg.tu-berlin.de</a></td>
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<td><a href="http://www.ztg.tu-berlin.de/">http://www.ztg.tu-berlin.de/</a></td>
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Profile

The Centre for Technology and Society (ZTG) started in December 1995. It has three tasks:
CHAPTER 3. INSTITUTIONAL INFORMATION

- to coordinate multidisciplinary research regarding technology and society
- to strengthen interdisciplinary teaching at the Technical University
- to be a forum for discussion about the interaction between technology and society

So far, the Centre has contributed to around fifty research proposals, most of them multidisciplinary. It has, moreover, re-organised interdisciplinary teaching at the university. The centre organises a regular colloquium "Technology and Society".

The range of topics is broad. The projects fall into three problem areas:

- historical, theoretical and ethical foundations of technological development
- cultural dimensions of technology
- social, economic and ecological shaping of technology

Among the research topics, special attention has been paid to five central themes:

- mobility
3.6. GERMANY

- new forms of labour and innovation research
- technology and daily life (especially technology for the elderly and the future of the information society)
- gender and technology
- international comparison of technological styles

The Centre can profit from the strong points of its Technical University, especially the availability of a broad spectrum of disciplines in the engineering sciences, economics, humanities and the social sciences.

Education

The priority is the further development of multidisciplinary and interdisciplinary teaching at the university. An important initiative in this area is the creation of a new international course on global production engineering. This course is an innovation at the university for two reasons: it will be given fifty percent in English, and it comprises considerably more interdisciplinary materials than most engineering courses. The course concentrates on technology and technology policy in South-East Asia and Europe.
Costs and admission criteria

Students should possess a relevant diploma, for example a Bacc. degree. German students should be proficient in English, whereas foreign students with sufficient knowledge of the German language will receive preferential treatment. If they wish, foreign students are offered a four-week German language course. German participants will follow a course "English as engineering language".

3.7 Greece

3.7.1 Department of History and Philosophy of Science, Athens

<table>
<thead>
<tr>
<th>Name</th>
<th>Department of History and Philosophy of Science</th>
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<tbody>
<tr>
<td>Address</td>
<td>37, J. Kennedy str.</td>
</tr>
<tr>
<td></td>
<td>Athens, 16121 Greece</td>
</tr>
<tr>
<td>Phone</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Kotsanis Sotiris</td>
</tr>
</tbody>
</table>
Profile

The Department of History and philosophy of Science was established at the University of Athens in 1992. It is one of the few departments where the study of history and philosophy of science can be undertaken at the undergraduate level.

The department approaches the study of science from a variety of perspectives: a methodological - internalist perspective (science as a linguistic system pertaining to truth), a historical perspective (the development of science and its institutional structures over time) and a cultural/social perspective (ideological influences on the development of science as well as the study of the social role of science and the institutions that foster it).

With the founding of this new department, the University of Athens aimed at the enhancement of interdisciplinary research, the old ideal of universitas, now under constant threat due to increased scientific specialisation and academic compartmentalisation.
3.7.2 Department of Mathematics, University of Patras

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Address</td>
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</tr>
<tr>
<td></td>
<td>265 00 Rion-Patras, Greece</td>
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<tr>
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<tr>
<td>Email</td>
<td><a href="mailto:mboudour@math.upatras.gr">mboudour@math.upatras.gr</a></td>
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<tr>
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<td>Moses A. Boudourides</td>
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Profile

Course name: Science, Technology and Society Semester: 4 (2nd year)
3.8 Hungary

3.8.1 Department of Philosophy and History of Science, Technical University of Budapest, Budapest

<table>
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<td>Technical University of Budapest</td>
</tr>
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</tr>
<tr>
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<tr>
<td>Phone</td>
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<tr>
<td>Fax</td>
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<td>Email</td>
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<tr>
<td>Contact Person</td>
<td>Imre Honrszky</td>
</tr>
</tbody>
</table>

Profile

The department of Philosophy and History of Science is part of the Faculty of Economics and Social Sciences at the Technical University of Budapest. It has 15 tenured staff members, and is headed by prof. Mrla Fehr.

Teaching and research at the department is partly dealing
with science, technology, and society topics. Its approach is mostly a social constructivist one, some members prefer more traditional perspectives, however.

The research is oriented towards:

- socio-cognitive models of scientific and technological change
- case studies of scientific and technological change
- ethics for engineers and environmental issues
- expertise as a social institution, and its cognitive-sociological dimensions (expert judgement, non-exact knowledge, technology assessment expertise)
- history of Hungarian engineering
- history of Chinese science and technology
- “Davidsonian problems” in philosophy
- methodological problems of future research (scenario versus forecasting approaches)

Education

Both undergraduate and graduate degrees can be obtained. It is moreover possible to acquire a PhD degree in the history of technology, engineering and science.
The department moreover offers a two-semester certificate course for postgraduates, "Advisor for Science, Technology, and Environmental Policy". The department has submitted an application at the Hungarian Accreditation Committee for a four-semester Postgraduate diploma for the history of science and technology. This application is presently under evaluation.

A diploma in engineering, science, or history is required.

The costs for remote education for a PhD degree are under consideration. PhD students are entitled to a small grant.

To give an indication, the certificate course recently cost 35,000 HUF/semester. An introductory course to a postgraduate diploma on history cost 25,000 HUF.

**International collaboration**

The department collaborates with a host of national and international institutions, among them the members of the European Association for the Study of Science and Technology EASST, the European Association of Analytical Philosophy ESAP, the Society for the Philosophy of Technology SPT, and the International Council for Science Policy Studies. Most intense collaboration is with the STI centres in Karlsruhe and Twente.
3.9 Ireland

3.9.1 Technological Innovation, Dublin

<table>
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<tbody>
<tr>
<td>Address</td>
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</tr>
<tr>
<td></td>
<td>Dublin 4, Ireland</td>
</tr>
<tr>
<td>Phone</td>
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<td>+353-1-7068954</td>
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</table>

Profile

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Education

Teaching specialisation:

- at undergraduate level: Strategy Implementation (BComm).

- at postgraduate level: Technological Innovation and Organisational Change (MBS); Organisation Structure and Design (MBS); Management (BE).
3.10 Italy

3.10.1 Italian National Agency for New Technology, Energy and the Environment

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
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<td>Address</td>
<td><a href="http://www.sede.enea.it/">http://www.sede.enea.it/</a></td>
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Profile

ENEA is the Italian government agency responsible for the areas of new technology, energy and the environment. Its two fundamental tasks are to conduct research in these areas and to diffuse the results nationally. More particularly, ENEA’s activities involve:

- research, development and testing of innovative technologies and equipment, and transfer of innovations to industry and agriculture;
CHAPTER 3. INSTITUTIONAL INFORMATION

- development of technologies, equipment and components designed to exploit renewable energy sources and to save energy, and stimulation of demand for renewable energy sources;

- design, construction and testing of demonstration plants; research and testing of innovative nuclear reactors possessing greater inherent or passive safety;

- dismantling of fuel cycle systems in earlier generation nuclear power plants;

- research on nuclear fusion in extensive collaboration with the Italian and international scientific communities;

- environmental surveying and monitoring;

- research and assessment of the impact of productive activities on the human and natural environments; development of advanced technologies and new products with low environmental impact.

The Agency, which has a staff of around 4500, is present throughout Italy, operating nine major Research Centres and a number of smaller facilities.

ENEA's tasks include disseminating knowledge and promoting outside relations in the areas of energy, environment
and innovation so that the results of its research can be put to the widest possible use.

To this end, the agency is open to collaboration with business enterprises; national, regional and local government administrations; the scientific community, universities and the school system. ENEA's publications and the activities conducted by the Information Bureau operating at its Research Centres constitute important vehicles for disseminating information. To extend the diffusion of information on products and services in the areas of energy and innovation, particularly to small and medium-sized enterprises, the Agency also runs Integrated Energy Consulting Centres and Technical Offices located in various parts of Italy. Besides supplying information and answering questions about technology and regulations, these organisations act to stimulate demand on the local level. ENEA is also authorised to promote the formation - in Italy, in the European Community or elsewhere - of the companies or consortia the purpose of which is the industrial development of technologies relating to its areas of responsibility.

ENEA may invest in them under programmes approved by the Inter-ministerial Economic Planning Committee (CIPE). At present ENEA, together with other national research organisations, industrial enterprises and local development agencies, holds interests in a large number of such companies and consortia. Of particular importance are the research, development and demonstration projects conducted by ENEA in Southern Italy,
where it has long operated three of its major Research Cen­
tres: Trisaia (at Rotondella, in the Province of Matera), Portici
(near Naples) and Monteaquilone (at Manfredonia, Province
of Foggia). A large number of projects have been undertaken
in the areas of agrobiotechnology, renewable energy sources,
the development of technologies for environmental protection,
and support to small and medium-sized enterprises, including
training and qualification activities. Some of these projects are
connected with the European Community’s VALOREN Pro­
gramme. In addition, ENEA is responsible for implementing
Italy’s programme of scientific and technological research in
the Antarctic (PNRA), under way since 1985 and co-ordinated
by the Ministry for Universities and Scientific and Technologi­
cal Research.

3.10.2 International Centre for Science & High Tech­
nology, Trieste

<table>
<thead>
<tr>
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<tr>
<td>Address</td>
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</tr>
<tr>
<td>Phone</td>
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</table>
Profile

The International Centre for Science and High Technology (ICS) is an autonomous institution operating under the aegis of UNIDO (United Nations Industrial Development Organisation). The Centre was established in 1988 as a UNIDO pilot project, as an initiative of Nobel prizewinner Abdus Salam. Law No. 51 of 15 February 1995 guarantees funding to ICS on an annual basis through the Italian contribution to UNIDO’s Industrial Development Fund.

The goals are to benefit developing and transition-economy countries through sustainable technology transfer and capacity-building in national industry. The target beneficiaries are national and regional R&D institutions, high-tech SMEs, and national policy and strategy decision-makers. The scientific areas covered are chemistry, environment, high technology and new materials. Attention is also given to technology transfer management.

The goals are to benefit developing and transition-economy countries through sustainable technology transfer and capacity-building in national industry. The target beneficiaries are national and regional R&D institutions, high-tech SMEs, and national policy and strategy decision-makers. The scientific areas covered are chemistry, environment, high technology and new materials. Attention is also given to technology transfer management.
CHAPTER 3. INSTITUTIONAL INFORMATION

Education

The ICS training programme includes courses, seminars, workshops, fellowships and study tours, and supports institutions and industries in developing countries in preparing feasibility projects to be submitted for donor funding. Training activities make use of in-house expertise and support tools, in particular applied information systems including technology data-bases, mathematical modelling, process simulation and image engineering, as well as publications and guidelines.

3.10.3 Istituto di Ricerca sulla Dinamica dei Sistemi Economici, Milan

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Address</td>
<td>Via Ampre 56, 20131 Milan, Italy</td>
</tr>
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<td>WWW address</td>
<td><a href="http://idse.mi.cnr.it">http://idse.mi.cnr.it</a></td>
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</table>

Profile

IDSE, the Research Institute on the Dynamics of Economic Systems, was founded in January 1987, and seeks to develop
the analysis of economic systems dynamics, with particular emphasis on technological change, human resources and natural-environmental resources. The Institute studies:

- the dynamics of economic systems
- the determining factors as well as the consequences of innovation and technological change
- the process of integration of economic systems at the international level
- the economic interdependence between developed and developing nations

IDSE works from three perspectives: fundamental theory, applied analysis and the development of political economy. The centre has a staff of 7 members.
### 3.10.4 Institute and Museum of History of Science, Florence

<table>
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<tr>
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</tr>
</thead>
<tbody>
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<tr>
<td></td>
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<td>Phone</td>
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<tr>
<td>Contact Person</td>
<td>Elena Montali</td>
</tr>
</tbody>
</table>

**Profile**

The Institute and Museum of History of Science is a science museum which actively promotes education. In 1959 the institute founded the scientific journal Physis in collaboration with other Institutions. Since 1976 it has published every six months Nuncius, an international journal of history of science that provides efficient documentation on all studies in the history of science published in Italy. Other publications are Biblioteca di Nuncius. Studi e testi, Archivio della corrispondenza degli scienziati italiani (a series of volumes containing collections of letters in various scientific disciplines), and Biblioteca della
3.11. THE NETHERLANDS

scienza italiana, the Institute’s most recent series dedicated to the most fundamental works in the history of science.

3.11 The Netherlands

3.11.1 Belle van Zuylen Institute, Amsterdam

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Address</td>
<td>University of Amsterdam</td>
</tr>
<tr>
<td></td>
<td>Rokin 84-90</td>
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<tr>
<td></td>
<td>1012 KX Amsterdam, the Netherlands</td>
</tr>
<tr>
<td>Phone</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>M. de Ceuninck van Capelle</td>
</tr>
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</table>

Profile

The Belle van Zuylen Institute is a research institute for multicultural and comparative gender studies. The central research theme is the process of the diffusion of formal equality between citizens and democracy in twentieth century society, which is in practice only partially valid for women. The institute studies the tensions and dynamics resulting from this, as well as the way in which gender constructions are being made permanent.
Democracy does not only relate to the political and economic institutions, but also to the area of language and culture (the formal and informal "right to speak").

Initially, women's studies in Amsterdam have focused strongly on the philosophical and theoretical debate within women and gender studies. In recent years, however, emphasis has shifted to empirical research, often fruitfully making use of the theoretical insights generated. This strong orientation towards the combination of theoretical and empirical research will be reinforced and extended in the next few years.

**Gender and technology**

One of the research projects is on gender and technology. Technology is a form of power which is not neutral but partly shaped by gender. This research project tries to approach technology as both metaphor and microcosm to better understand Western modernity. Thus, technology is not only understood as a collection of technical artefacts, practices and knowledge. Technology could be called one of the best-defended male bastions, although it is in principle accessible to anyone. The project studies the ways and forms in which sex and gender biases lead to exclusionary practices both symbolic and practical. The project is linked to the larger national research in the history of Dutch technology.
Education

The institute teaches at the post-doctoral level. The training of PhD students is one of its priorities. Both in its education and in its research activities, the institute has a strong interdisciplinary flavour.

3.11.2 Cultural and science studies, Maastricht

| Name          | Cultural and science studies  
|               | Faculty of Arts and Culture   
|               | University of Maastricht      
| Address       | P.O.Box 616                   
|               | NL-6200 MD Maastricht         
|               | the Netherlands               
| Phone         | 31 43 3883476                 
| Fax           | 31 43 3259311                 
| Email         | g.wackers@tss.unimaas.nl      
| WWW address   | http://www.unimaas.nl/~fdcwmwt/tss 
| Contact Person| G. Wackers                   

Profile

The Faculty of Arts and Culture was the sixth Faculty to be established in the University of Maastricht, which is located in the city of Maastricht in the southernmost part of the Netherlands. The faculty of Arts and Culture offers one programme:
Arts and Sciences. The University of Maastricht was officially established on 9 January 1976. The first students in Arts and Sciences began their studies in September 1991. The Faculty has developed into a community with a staff of around 60 academic and 10 administrative and support staff, and around 400 students. The faculty is located in the ancient centre of the city of Maastricht.

The Arts and Sciences Programme focuses on issues confronting modern Western culture. A culture which is being profoundly influenced by dynamic developments in science and technology. Modern societies are characterised by a great degree of complexity. Technological developments are proceeding at a rapid pace, making great inroads into all areas of life. The concomitant changes generate a variety of ethical, political and social issues and choices. There is considerable interest in such questions throughout society. Increasing attention is being paid to the quality of life, to cultural and philosophical issues, to standards and values and to the ideas and artistic creations in which these themes find expression. New visions are being formed regarding the development of society in the long term. At the same time, it cannot be denied that traditional answers to such problems, which to a large extent have had collective validity, frequently fall short. The current process of re-evaluation of major political ideologies is one result of this insight. At this moment in history, a comprehensive re-examination of basic points of departure is absolutely essential. There is also con-
siderable interest in artistic themes concerned with the place of
the individual in modern society, as well as themes focused on
culture, identity and the past.

The issues generated by modern culture form the back­
ground for the Arts and Sciences Programme. The focus of the
programme is on the analysis of various, often conflicting sci­
centific and non-scientific points of view, with particular empha­
sis on the arts. Special consideration is given to the historical
and social contexts of traditions and of concrete social prob­
lems. This "problem-based learning" approach is supported by
practicals, language and writing skills training. The Faculty's
examination system has been designed in line with this multi­
disciplinary acquisition of knowledge. Research by the Faculty
concentrates on a restricted number of themes and is largely
based on interdisciplinary co-operation between history, phi­
losophy, art and literature, social science and technology.

Education

Degree: MSc in Arts and sciences

Arts and sciences is built up of four programs:

- Human and nature
- technological culture
- theory of culture and practices of art
• political culture
• visual culture

Problem problem-based learning

Like the other Maastricht Faculties, the Faculty of Arts and Culture is characterised by its special educational approach: problem-based learning. Rather than passively attending lectures, students meet twice a week in tutorial groups to discuss issues confronting modern western culture. Based on the group’s analysis of the issue students take their own responsibility to collect new information. An important characteristic of such contemporary issues is that they cannot be subsumed under any single discipline. On the contrary, they are generated precisely by the clash between points of view which, in themselves, are quite rational. It often seems impossible to reconcile such points of view. Currently, conflicts between standpoints and their traditional frameworks are also involved.

The aim of problem-based learning is to overcome various drawbacks in the traditional method of instruction, for instance the passive role of students during lectures, lack of integration between disciplines, insufficient preparation of the students for continuing their own education after graduation, and, of particular importance, the difficulties experienced by many graduates in applying what they have learned in actual practice. This is a
common experience among graduates of different disciplines.

The problem-based learning method is applied as follows. The starting point is a particular problem, which is presented to the students before they have studied the appropriate subject matter. The tutorial group of about twelve students attempts to produce an analysis of the problem by using their existing knowledge. During this analysis various questions are raised by members of the group. On the basis of this process, learning objectives for individual study are formulated. Each student undertakes to gather relevant information as specified by the group's learning objectives. In the period between two tutorial group meetings the students work on these tasks, either individually or together. They read the literature, watch video tapes, and consult members of the staff. At the next group meeting they compare their findings and discuss whether they have gained a better and deeper understanding of the problem. Sometimes the information they have gathered is sufficient to solve the problem; at other times the students find that they need to formulate new questions and continue their studies. Empirical studies of the effects of this approach, including those conducted at the University of Maastricht, support the belief that students who have received their training within a problem-based learning setting are better equipped for problem solving in practice (Schmidt, 1983).

As a basis for a sound analysis of the multiformity of standpoints displayed by modern societies, the Arts and Sciences
Programme utilises insights, methods and techniques borrowed from philosophy, historical research, the humanities and the arts.

3.11.3 Center for Science and Technology Studies, Leiden

<table>
<thead>
<tr>
<th>Name</th>
<th>Center for Science and Technology Studies (CWTS) Leiden University</th>
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</thead>
<tbody>
<tr>
<td>Address</td>
<td>PO Box 9555, 2300 RB Leiden</td>
</tr>
<tr>
<td>Visiting address</td>
<td>Pieter de la Court Building</td>
</tr>
<tr>
<td></td>
<td>Wassenaarseweg 52, 2333 AK Leiden, the Netherlands</td>
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<tr>
<td>Phone</td>
<td>+31 71 527 3909</td>
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<tr>
<td>Fax</td>
<td>+31 71 527 3911</td>
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<tr>
<td>Email</td>
<td><a href="mailto:office@cwts.leidenuniv.nl">office@cwts.leidenuniv.nl</a></td>
</tr>
<tr>
<td>WWW address</td>
<td><a href="http://sahara.fsw.leidenuniv.nl/cwts/">http://sahara.fsw.leidenuniv.nl/cwts/</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>A.F.J. van Raan (director)</td>
</tr>
</tbody>
</table>

Profile

The Centre for Science and Technology Studies (CWTS) has been established within the Leiden University as a centre for scientific research, independent analysis and advice in matters concerning scientific and technological development. In par-
ticular, CWTS specialises in advanced quantitative analysis of science and technology performance and the cognitive and organisational structure of science and technology. High quality work is carried out for governments, European Union (EU), national and international research organisations, universities and companies. The CWTS is an interdisciplinary research institute housed within the Faculty of Social Sciences. The CWTS participates in the Netherlands Graduate School of Science, Technology, and Modern Culture.

The CWTS research programme is devoted to quantitative studies of science and technology. It aims at the advancement of knowledge on the development of science and technology, including in relation to societal, policy and management questions. CWTS places a special, but certainly not exclusive emphasis on the role of quantitative, in particular bibliometric (i.e., based on data from scientific and technological literature) methods. The Centre's research is both problem-oriented and basic in nature. Our approach is interdisciplinary, using methods from the natural as well as the social and behavioural sciences. There are interesting links with philosophy and sociology of science, and with policy and management studies. Important aspects of our work can be seen as information science. CWTS staff consists of researchers from a wide range of disciplines. They work closely together in the CWTS research programme.

CWTS' core interests fall into four interrelated areas:
CHAPTER 3. INSTITUTIONAL INFORMATION

- development of methods and techniques for the design, construction, and application of quantitative indicators on important aspects of science and technology

- development of information systems on science and technology

- study of the interaction between science and technology

- study of cognitive and socio-organisational processes in the development of scientific and technological fields and developmental processes.

Education

CWTS also contributes to academic teaching. Certainly our experience, expertise and international position enable us to provide students and other interested persons and organisations with courses of the highest quality. Therefore, we will gradually extend our teaching programme.

As yet, our teaching activities focus on courses within our University, in Dutch. These courses are designed for the "regular" university students in their last year (of all disciplines), but also for PhD students of the Netherlands Graduate School of Science, Technology and Modern Culture, and for interested professional groups from libraries and publishers, governmental organisations, research councils, and R&D divisions of the
business sector.

We hope to expand our teaching activities to an international level in the framework of European Union programmes. Those who are interested in international teaching activities of CWTS should express these interests to the Rector of the Leiden University.

3.11.4 MERIT, Maastricht

<table>
<thead>
<tr>
<th>Name</th>
<th>MERIT, Maastricht Economic Research Institute on Innovation and Technology, University of Maastricht</th>
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</thead>
<tbody>
<tr>
<td>Address</td>
<td>P.O. Box 616</td>
</tr>
<tr>
<td></td>
<td>6200 MD Maastricht, The Netherlands</td>
</tr>
<tr>
<td>Visiting address</td>
<td>Tongersestraat 49</td>
</tr>
<tr>
<td></td>
<td>Maastricht, The Netherlands</td>
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<tr>
<td>Phone</td>
<td>(31) (0)43 3883875</td>
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<tr>
<td>Fax</td>
<td>(31) (0)43 3216518</td>
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<td>Email</td>
<td><a href="mailto:C.Gijsbers@merit.unimaas.nl">C.Gijsbers@merit.unimaas.nl</a></td>
</tr>
<tr>
<td>WWW address</td>
<td><a href="http://www.merit.unimaas.nl">http://www.merit.unimaas.nl</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>C. Gijsbers (for the PhD programme)</td>
</tr>
</tbody>
</table>

Profile

MERIT is a university research institute based at the Economics Faculty of the Maastricht University, the Netherlands. We fo-
cus on research on the economics of technological change and innovation.

**Education**

MERIT and UNU/INTECH have joined forces to offer a Ph.D. study programme, in co-operation with the University of Maastricht, on the policy and economic dimensions of technical change. Supervision of the studies will be by scholars from both MERIT and UNU/INTECH while the Ph.D. degree will be granted by the University of Maastricht. The programme is designed for students who are interested in conducting research on the theoretical, institutional and policy issues underlying technical change and on the role of technical change in fostering economic growth and development in both industrialised and developing countries.

**Structure of the Programme**

The Ph.D. programme has an overall length of three years and is divided into two distinct stages of study. The first stage begins in September and lasts six months. During this stage students will take courses in the areas of economics, policy, and the institutional foundations of technical change. Those students that achieve exceptional distinction in their coursework will be invited to prepare a Ph.D. proposal that includes the identification of a topic, discussion of the topical and methodological issues of the field in which the Ph.D. will be pursued,
and where appropriate, an identification of the data resources to be utilised or developed. The proposal will also identify further areas of formal (class work and workshops) and informal study to be pursued in the course of dissertation research and writing. Upon acceptance of this proposal, students will be admitted to the Ph.D. programme. While preparing their thesis, which is expected to take two and a half years, students will meet with their supervisor regularly in order to assess their progress. Upon completion of their thesis, students will defend it before a committee composed of University of Maastricht and external faculty.
3.11.5 newMetropolis in Amsterdam

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Address</td>
<td>Postbus 421</td>
</tr>
<tr>
<td></td>
<td>1000 AK Amsterdam, the Netherlands</td>
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<tr>
<td>Visiting address</td>
<td>Oosterdok 2</td>
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<tr>
<td></td>
<td>1011 VX Amsterdam, the Netherlands</td>
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<tr>
<td>Phone</td>
<td>020 5 31 32 33</td>
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<tr>
<td>Fax</td>
<td>020 5 31 35 35</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:webmaster@newmet.nl">webmaster@newmet.nl</a></td>
</tr>
<tr>
<td>WWW address</td>
<td><a href="http://www.newmet.nl">http://www.newmet.nl</a></td>
</tr>
<tr>
<td>Open</td>
<td>Sun through Thurs, 10-18 o’clock; Fri and Satur 10-21 o’clock; between 1 July and 31 August all days 10-21 o’clock.</td>
</tr>
</tbody>
</table>

Profile

newMetropolis is a novel science and technology centre in Amsterdam. It is housed in a new building site in Amsterdam, near the harbour.

Science asks questions of the natural world, and attempts to answer them. This questioning process and how it is structured is fundamental to human activity. Scientific activity since the late renaissance has been shaped by questions, conceptual
3.11. THE NETHERLANDS

model-building, and a process where experimental results can be reproduced independently and validated by the scientific community. This process, which Leibniz refers to as the scientific enterprise, is a dialogue where empirical evidence and conceptual models are often in tension, and gives rise to debates, controversies, and occasionally paradigm shifts - dramatic shifts in consensus.

Crime Lab

One of the educational projects is the crime lab. The crime lab is meant for pupils in the highest levels of primary schools. On the basis of a newspaper clip, the children investigate a crime that has been committed, by means of:

- analysis: fibers, paints, and suspect powder
- biology: hair, suspect red drops, finger printing
- phorensics: foot prints, handwriting on a piece of paper, pencil ink

Finally, they have to determine who did it. Just as in real life, it is not always possible to pin down a suspect, there is always a certain degree of uncertainty about the knowledge gained ...
3.11.6 Theory and History of Psychology, University of Groningen, Groningen

| Name                  | Theory and History of Psychology
|                       | University of Groningen          |
| Address               | Grote Kruisstraat 2/1            |
|                       | 9712 TS Groningen                |
| Phone                 | 31 50 3636366                    |
| Fax                   | 31 50 3636304                    |
| Email                 | G.C.G.Dehue@ppsw.rug.nl          |
| WWW address           | G.C.G.Dehue                       |
| Contact Person        | G.C.G.Dehue                       |

Profile

In the 20th century, people have increasingly come to look at themselves from a psychological point of view. Many decisions in politics, firms, schools, and hospitals are inspired by psychological notions, which explains the relevance of research into the nature and social impact of psychology. In the Theory and History of Psychology section, aspects of psychology are studied with methods borrowed from the history and sociology of science, historical sociology and social philosophy.

The overall research theme is “objectivity and subjectivity in psychology”. In the history of psychology, the claim of objectivity has been based on various factors, such as the use
of methodological rules, research apparatus, and pictures. The role and impact of these ways of creating objectivity are analysed. Moreover, debates about subjectivity in phenomenological psychology and psycho-analyses are investigated, as well as the role of metaphors in psychological research.

The Theory and Psychology section also houses the Archives and Documentation Centre of Dutch Psychology, which collects and preserves historical materials (archives, printed matter, apparatus, tests, films), organises expositions, and helps historians with their research projects.

**Education**

The section offers a master’s programme and a PhD programme. The master’s classes for the Dutch students are given in Dutch. PhD students receive individual education at the department and collective education at the winter and summer schools of the international research school WTMC.
3.11.7 TNO Centre for Technology and Policy Studies, Apeldoorn

<table>
<thead>
<tr>
<th>Name</th>
<th>TNO Centre for Technology and Policy Studies</th>
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<tbody>
<tr>
<td>Address</td>
<td>P.O. Box 541</td>
</tr>
<tr>
<td>7300 AM Apeldoorn, The Netherlands</td>
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<tr>
<td>Visiting address</td>
<td>Laan van Westenenk 501</td>
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<tr>
<td>Apeldoorn, The Netherlands</td>
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<td>Phone</td>
<td>+31 55 549 35 00</td>
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<td>Fax</td>
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</tr>
<tr>
<td>WWW address</td>
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<td>Contact Person</td>
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</table>

Profile

The TNO Centre for Technology and Policy Studies provides a crucial link between strategic policy and the development of technology. The Centre aims to promote the establishment of an innovative economy and a sustainable society in collaboration with government and businesses, a relationship which can be expressed through the provision of consultancy and advice as well as process management and support in making decisions on technological applications. It is a role that helps to bridge the gap between technological opportunity and the needs and
requirements of the economy and society.

The Centre undertakes assignments for the public and private sector and lends support to research institutes and other users. Its unique position within the TNO organisation enables the TNO Centre for Technology and Policy Studies to make use of a multidisciplinary structure to give substance and shape to its role in facilitating decision-making on technology applications. Decisions which focus on applications like reorganising the knowledge structure, shaping and implementing industry and technology policy, strategic choices in business clusters and networks, and designing the information society.

Staff and personnel: 60

The Centre consists of the following research and consultancy teams:

- Technology, Economy, Organisation and Strategy (KEC);
- Technology and Sustainable Development (MB);
- Innovation in Technology and Policy (IB);
- Information and Communication (IC).

International collaboration

- Büro für TA der Deutsche Bundestag (Germany).
• Centrale Management (France).
• Credoc (France).
• European Centre for Infrastructure Studies (the Netherlands).
• IDATE (France).
• Institut für Systemanalyse und Innovationsforschung, Fraunhofer (Germany).
• Institute for Prospective Technological Studies (IPTS) (Spain).
• SPRU (UK).
• Stichting Technologie Vlaanderen (Belgium).
• Technology Policy Unit, Aston University (UK).
• Warwick Business School (UK).
• Quincy Segal (UK).
3.11.8 Department of Technology and Society Studies, Maastricht

<table>
<thead>
<tr>
<th>Name</th>
<th>Department of Technology and Society Studies (TSS) University of Maastricht</th>
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<tbody>
<tr>
<td>Address</td>
<td>P.O.Box 616, NL-6200 MD Maastricht</td>
</tr>
<tr>
<td>Visiting address</td>
<td>Kapoenstraat 2 Maastricht, the Netherlands</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>G. Wackers</td>
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</tbody>
</table>

Profile

The Department of Technology and Society Studies (TSS) was established in 1994 to bring together a variety of researchers sharing an interest in technology studies. Together with the departments of Philosophy, History and Literature and Art, our department constitutes the Faculty of Arts and Culture of Maastricht University.

The department has 8 researchers.
Projects

The following is a list of the research and teaching projects various members of the Department of Technology and Society Studies are involved in:

- CWS Thesis Series: a publication series of the Faculty of Arts and Culture (in Dutch; coordinator: Ger Wackers)
- ELECTRA: Electronic Learning Environment for the Continual Training and Research in ALMA (Harro van Lente)
- ESST: European Studies on Society, Science and Technology (director of studies: Jessica Mesman)
- NECSTS: Network of European Centers in Science and Technology Studies (coordinator: Ger Wackers)
- Open and Distance Learning: Gillette on the Net (local coordinator: Bernike Pasveer)
- SLIM: Social Learning in Multimedia (Harro van Lente)
- Workshop Images of Technology (coordinator / shop-manager: Ger Wackers)
Education: ESST in Maastricht

The European Inter-University Association has launched a new course leading to a master’s degree "Society, Science and Technology in Europe".

The central aim of the ESST programme is to train a new scientific "cadre" with the expertise to address the immense problems that face Europe and the world now and in the immediate future. In these problems, as well as in the possible strategies to solve them, the relationships between society, technology and science play a crucial role. These problems are of an unprecedented complexity and we cannot hope to start addressing them adequately from within the orthodox scientific perspectives. Hence, a radically new programme is called for in order to train scientists at the highest academic level, from a multidisciplinary perspective, and in a truly international spirit.

The course is designed to provide post-graduate training for academics of all backgrounds from social scientists to natural scientists, engineers and humanities scholars. The master’s course is offered by an association of leading STS university departments in Europe. The course also draws on collaboration with industry and government agencies.

The approach is inter-disciplinary, based on recent results from research at the frontiers of modern studies of science/technology and economy/society.

The course aims to apply such research to political and cul-
tural analyses of modern science- and technology-based societies, the social and economic analysis of innovation, to strategic decision-making and management of science and (new) technologies and to ethical issues in science and technology.

The approach in this ESST course is important and necessary because:

- Innovation and technological change are not merely technical or engineering matters: they are social processes. Political, economic and cultural processes shape the evolution of technology.

- The application and spread of technologies also involve social decisions: economic decisions, involving costs and benefits of technology, political decisions to commit large public funds or to support R&D, cultural decisions involving ethical issues leading to rejection or adoption of innovation.

- Technologies have impacts on society: new technologies reshape patterns of work and settlement; some technologies seriously damage the environment; technologies shape our modern culture. For these reasons active social awareness of the relations between society, technology and science on the part of engineers, civil servants, industrialists, consumers, researchers and politicians is required.
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The course has two semesters. The first semester consists of five modules of three weeks each:

- "Problems of Society, Technology and Science”
- "Society, Science and Technology in the long term: historical perspectives”
- "Science and Technology in the Making: Entering the World of the Laboratory”
- "Globalisation and Regulation of Science and Technology”
- "Politics of Knowledge”

In the second semester, students can choose one of the following research specialisations, at one of the European universities:

- Science, Technology and Innovation in an Historical Perspective, University of Bari
- Science-Technology and Industry-Academic Relationships, Basque Country University
- Cities, Territories and Technologies, Ecole Polytechnique de Lausanne
• Technological Culture, University of Limburg

• Economics of Technical Change, University of Limburg

• Gender, Science and Technology, University of East-London

• Europe in an Information Society: theory and policy, University of East-London

• Biotechnologies and Society, Université Catholique de Louvain

• Strategic Management of Technology and Innovation, Universidad Autonoma Madrid

• Computers and Law, Facultés Universitaires Notre Dame de la Paix Namur

• Science or Technology Teaching and Society: education for understanding, assessing and handling S&T, Facultés Universitaires Notre Dame de la Paix Namur

• Technology Assessment: methodologies, application to specialized fields and case-studies, Facultés Universitaire Notre Dame de la Paix Namur

• The Making of Science and Technology Policy: firms and governments, University of Oslo
3.11. THE NETHERLANDS

- The Technological History of Modern Europe: Technology, the Firm and Society, University of Oslo
- Innovation Policies in the wider European Context, Roskilde University Center
- Science, Technology and the Public, University Louis Pasteur Strasbourg
- From Theories of Innovation to technological Policies, University Louis Pasteur Strasbourg

The second semester starts with a brief course on the specific research field and is then largely devoted to supervised thesis research.

The organisation of the course is such that the students stay in the so-called "home university" during the first semester, receiving education from internal and visiting professors. In the second semester students move to the university which offers the specialisation of their choice.

Costs and admission criteria

A maximum of 20 students will be admitted after a selection interview. Requirements are: an academic degree (equivalent to four years of University training), active knowledge of English, passive knowledge of at least one other European language is
an advantage. There are two possibilities. The full two-semester course leads to a master’s degree. Students who enrol for only the first semester will receive a diploma describing the course contents.

Tuition for the master’s degree is Fl. 3,500 for students from participating countries in the ESST-network (for these students the ESST Association receives funding from the European Union.) and Fl 15,000 for students from non-participating countries. Tuition for the diploma (only the first semester): Fl. 2,000 for students from countries participating in the ESST-network, Fl. 8,000 for students from non-participating countries.

3.11.9 Science and Technology Dynamics, Amsterdam

<table>
<thead>
<tr>
<th>Name</th>
<th>Science and Technology Dynamics</th>
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<tbody>
<tr>
<td></td>
<td>University of Amsterdam</td>
</tr>
<tr>
<td>Address</td>
<td>Nieuwe Achtergracht 166</td>
</tr>
<tr>
<td></td>
<td>1018 WV Amsterdam, the Netherlands</td>
</tr>
<tr>
<td>Phone</td>
<td>31 20 5256595</td>
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<tr>
<td>Fax</td>
<td>31 20 5256579</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:sts@chem.uva.nl">sts@chem.uva.nl</a></td>
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<tr>
<td>WWW address</td>
<td><a href="http://www.chem.uva.nl/sts">http://www.chem.uva.nl/sts</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Loet Leydesdorff</td>
</tr>
</tbody>
</table>
Profile

The Department was created as a centre of excellence for science and technology studies by a joint effort of the University of Amsterdam and the Dutch Government in 1982. In 1987, it was given the right to award its own M.Sc.

While a cohesive unit in terms of departmental commitment and goals, the faculty consists of about a dozen members drawn from a variety of specialised fields. Many have been trained in both the field of their methodological expertise and in the particular area of science on which their research is focused.

Areas of specialization include:

- relationship between medical technologies, biomedical knowledge and professional practices
- environmental issues and biological sciences
- technological sciences and science-based industries
- science policy and research management
- scientometrics
- the occurrence of change and continuity in scientific developments

The department has 22 members, including PhD students.
Education

The curriculum can be followed in a number of ways: as a one-year programme leading to a Master’s degree or - in consultation with members of the department - as a specially designed programme tailored to the individual student’s background knowledge and interests. A full three-year course of study in the programme Science, Technology and Culture, is also available for students who have completed their first year of university study in a different field. Throughout the programme, students work in small groups and attend (introductory as well as advanced) lectures and seminars in Science Dynamics. They also benefit from individual training and guidance in the pursuit of their chosen field of research. In addition to Dutch, many courses are taught in English.

Supplemental to the programme’s core curriculum, courses are offered in conjunction with other faculties in the social and natural sciences as well as philosophy.

A catalogue with detailed information on Science and Technology Studies in Amsterdam is available at the Secretariat of the Department.

Admission criteria

In keeping with the flexibility of the programme, a variety of students are eligible for admission. Graduates working toward
an advanced degree are admitted directly into the Master's programme. Students can also attend in their third (Junior) year of university studies as exchange students. It is assumed that all applicants will have a strong academic record.

**International collaboration**

Because the Department is a participant in the ERASMUS (SOCRATES) exchange programme, students from various EU countries are eligible for funding via this programme. Students from outside the EU are also encouraged to apply.

The formal arrangements for foreign students who are not admitted through the ERASMUS network are made through the ACCESS programme in social sciences, philosophy and science dynamics in which the Department also participates.

The address is: ACCESS University of Amsterdam, Oudezijds Achterburgwal 237, 1012 DL Amsterdam, The Netherlands (Tel. 31-20-525 4702, Fax: 31-20-525 2086).

**Beta-Gamma foundation course**

The department is also one of the initiators of a novel foundation course at the University of Amsterdam: the beta-gamma foundation course. This one-year course is meant for students who do not wish to limit themselves but want to practise science from a broad base. Getting an insight into the relationship
(or absence thereof) between the sciences, social sciences and humanities is central.

The course moreover aims to teach the specific skills of the natural and social sciences, thereby creating more in-depth knowledge of the identity of the various disciplines. The course is thereby moreover a sufficient foundation for further study in one of the specialised sciences.

3.11.10 The Netherlands Graduate School of Science, Technology and Modern Culture (WTMC)

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Scientific Director</td>
<td>Wiebe Bijker</td>
</tr>
<tr>
<td>Coordinator</td>
<td>Rob P. Hagendijk</td>
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<tr>
<td>Chair</td>
<td>Arie Rip</td>
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Profile

The Netherlands Graduate School of Science, Technology and Modern Culture (WTMC) is a formal collaboration of Dutch researchers studying the development of science, technology and modern culture. The Graduate School provides advanced training for Ph.D. candidates whose research concerns:
3.11. THE NETHERLANDS

- the manner in which the design and organisation of science and technology are interwoven in the development of modern, 'rationalized' societies and cultures, and

- the problems this interpenetration implies for the development and shaping of science and technology as well as culture and society.

The Graduate School also coordinates research activities in both areas by Dutch researchers affiliated with WTMC.

The researchers participating in the Netherlands Graduate School of Science, Technology and Modern Culture are affiliated with the Universiteit Maastricht, University of Amsterdam, and University of Twente. Agreements have been reached with the University of Groningen, the University of Leiden, and the Agricultural University of Wageningen enabling researchers from these institutions to participate in the Graduate School. The institutes involved in the Graduate School conduct the vast majority of research in this area in the Netherlands.

The Graduate School has a total of 48 affiliated researchers. The number of Ph.D. candidates in 1995 is 42.

The Graduate School of Science, Technology and Modern Culture is comprised of researchers from a variety of disciplines: philosophy, humanities and history, psychology and sociology. In addition to completing degrees in the aforementioned disciplines, a considerable share of the researchers also has been educated in the natural and technical sciences.
The Ph.D. Curriculum

The Netherlands Graduate School of Science, Technology and Modern Culture offers young researchers a thorough Ph.D. training program. In keeping with the requirements of the National Training Program in Science and Technology Studies, established in 1987, in their first two years of study Ph.D. candidates take part in four intensive three-day workshops and two, week-long international summer schools. As of 1996, Ph.D. candidates also will attend winter schools in their final two years of study. Furthermore, Ph.D. candidates in their final two years will participate in workshops organised by researchers affiliated with the study groups at the graduate school.

Participants in the Ph.D. Training Program acquire an intimate knowledge of both traditional and contemporary conceptions and interpretations of the interpenetration of science, technology and modern culture. An overview of the research agendas and approaches of the relevant disciplines in this area of study is also provided. Besides theory, Ph.D. candidates learn a wide range of research skills and methods. The focus is on how these insights may be applied to the students’ own research projects.

Apart from the Ph.D. candidates affiliated with WTMC, a select number of other researchers can participate in the graduate school and the workshops.

WTMC Summer Schools and Winter Schools
Since 1986 the annual international summer school has hosted young Dutch as well as foreign researchers from Scandanavia, Belgium, Denmark, France, Germany, Austria, Spain, Italy, Greece and the United Kingdom. Each year a special theme is chosen and introduced by a leading researcher in that area. Besides closely examining that researcher’s work, participants also have the opportunity to present their own work. To ensure active participation, the relevant research articles are distributed in advance, and the students work together in groups on various assignments.

In addition to the summer schools, the Graduate School has organized winter schools for advanced Ph.D. candidates. At the winter schools Ph.D. students present sections of their dissertations and receive critical commentary from leading Dutch and foreign researchers as well as from the other participants. The winter schools are organized around a more general theme, and there is ample opportunity for informal exchange.

WTMC organizes the summer and winter schools in collaboration with its partners in the Network of European Centres in Science and Technology (NECSTS) and the European Association for the Study of Science and Technology (EASST).
3.11.11 Centre for Studies of Science, Technology and Society, Twente

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<td>School of Philosophy and Social Sciences</td>
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<td></td>
<td>University of Twente</td>
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<td>Contact Person</td>
<td>G.M.Linde-deRuiter</td>
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Profile

The research of the School of Philosophy and Social Sciences is organised in two clusters: Communication Studies and Science, Technology and Society Studies. The division into two clusters is linked to the existence of two degree courses: Applied Communication Science and Philosophy of Science, Technology and Society. In time, there will be integrated research pro-
3.11. THE NETHERLANDS

grammes for the two clusters. For the moment, the clusters consist of the research programmes of the participating Departments.

The Science, Technology and Society Studies (STS) cluster comprises the Philosophy of Science and Technology, General Philosophy, and History of Science and Technology Departments. The first two are actively working towards integration, or at least synergy and complementarity, of their research programmes; their research is part of the Science, Technology and Modern Culture Research School. The third Department, which focuses exclusively on history of science and history of ideas, may or may not participate in these attempts; at the moment, the research of the Department is part of the Huisinga Research School.

The present outline of ongoing research in the STS cluster is limited to the Philosophy of Science and Technology (FWT) and General Philosophy (SW) Departments. The research of the latter Department goes into less detail than that of the former, because the Department is in a transitional phase, with new staff members expected to take the place of retiring ones, and working on what is called the "empirical turn" in the philosophy of technology, but still somewhat programmatically. The research of the Philosophy of Science and Technology Department is (in spite of its name) focused on empirical studies of science and technology in society, including science and technology policy analysis, technology assessment, and gender and
technology studies.

**Research programmes**

The research programme of FWT: “Societal Construction of Science and Technology”.

The objects of study are the "processes in which science and technology are made": from the first tentative experiments and design, to knowledge claims and technological options, their adoption and adaptation, the emergence and stabilisation of socio-cognitive and institutional regimes, and embedding of science and technology in society. Case studies of specific developments in scientific and technological areas, as well as analysis of controversies about new technologies like nuclear energy and biotechnology, continue to be made. Opportunities for influencing such developments are charted and analysed, for example in transport and mobility regimes. "Societal construction" in the title of the research programme refers to a particular approach to science, technology and society studies, that of constructivism (including societal forces), but also to the possibility of actively constructing science and technology in society, and contributing to such construction on the basis of the research programme.

For the present overview, five lines of work are presented.

1. Science studies and science policy studies (Rip, Van der
3.11. THE NETHERLANDS

Meulen, Jelsma, junior researchers)

Institutions in the science system and policy instruments are seen as part of an evolving multi-level system, with particular attention to an intermediary layer of institutions between the nation state and ongoing research (in various research performance organisations), and to the advent of a regime of 'strategic science.' Historical and cross-national comparative studies have been made, and policy instruments and their effects are analysed in the broader contexts. R&D evaluation, science and technology foresight, and peer review and the issue of societal quality of research are topics of ongoing research.

2. Scientific-technical and technological regimes (Smit, Rip, Schot, Disco, Elzen, Jelsma, junior researchers)

Scientific and technical change is patterned and structured, and the regimes and the networks and institutions that support them (at meso-levels) are the key to understanding how changes are oriented and constrained. Aspects and variables that have been, and are being studied, are: expectations and promises about new developments; niches in technological evolution; socio-technical networks; role of engineers and of technical sciences; insiders and outsiders in regimes. Socio-technical regularities in the development and stabilisation of regimes have
been identified, and are now also used to construct socio-
technical scenarios pinpointing co-evolution of technol-
ogy and society. Cases studied range across all sciences 
and technologies, with an earlier emphasis on military 
technology and biotechnology, and at present also trans-
port and mobility (cf. 3) and information and communi-
cation technologies (cf. also 4).

3. Changing regimes: the challenge to influence technolog-
ical developments (Schot, Rip, Elzen, Jelsma, junior re-
searchers)

The external measures of technology policy have little 
effect, or reinforce what is happening anyway. Instead, 
ways to influence development of technology can be de-
finied based on an understanding of dynamics, and in 
particular of novel options and regimes. On this ba-
sis, Constructive Technology Assessment has been de-
veloped: anticipation of societal embedding and feed-
back into early stages of development. More recently, ap-
proaches to introduce (desirable) new technology are be-
ing studied under the label Strategic Niche Management.
Extensive comparative case studies have been made for 
the introduction of electric vehicles, and new systems of 
transport in general.

4. New technology and society (Oudshoorn, Stemerding,
Kirejeczyk, Jelsma, Van Oost, junior researchers)

Articulation of acceptability or non-acceptability (of particular technologies, or for particular aspects like gender) is the central phenomenon studied. In addition to emergence, stabilisation and change of regimes which include users and beneficiaries/victims, the concept of 'script' of an artefact or system is utilised, for example in information and communication technologies, to understand how behaviour and social order is being structured. Alignment of new technology and society occurs all the time, sometimes through modification of the technology, more often through modification of society. In addition to analysis and reflection, there is a design question: how to do better?

5. History of technology and modernity (Schot, Rip, Disco, Van Oost, junior researchers)

The present focus, on the history of technology in the Netherlands in the 20th century, derives from participation in a big seven-year inter-university research programme on this topic, with extensive funding from government and business, led by Lintsen (Technical University of Eindhoven) and Schot and Rip.
CHAPTER 3. INSTITUTIONAL INFORMATION

The research programme of SW: "Philosophy of Technological Culture":

'Technological culture' refers to the ongoing transformation processes of technological developments, themselves products of our culture, which change this culture, often in unsuspected ways. The research programme aims to study these processes, and not just in the traditional way of an inquiry into historical and transcendental conditions of modern technology. The empirical turn in Science and Technology Studies and the analysis of actuality (Foucault) are the main entry points, and links with technological sectors (environmental, medical, and information technology) and policy areas are important. The programme is based on three lines of research:

1. Hermeneutics and anthropology of technology, including studies of the technologically mediated relation between nature and culture. (Kockelkoren, Breij, Fleischhacker, junior researchers)

2. Social philosophy and ethics of technology, with themes like scarcity, utopia, moralisation of devices (their scripts, and possibilities of better design) (Achterhuis, Swierstra, Breij, Tijmes, junior researchers)

3. Evaluation of philosophies of technology, with particular attention to 'the empirical turn' (all members of the
Department)

Education

Teaching is organized in three streams:

- Applied communication science
- Philosophy of science, technology and society
- Philosophical and social scientific education

3.12 Norway

3.12.1 ESST at the University of Oslo, Oslo

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<td>Olav Wicken</td>
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</table>
Profile

The European Inter-University Association on Society, Science and Technology (ESST) is an association of 15 universities which jointly teach and conduct research in the field of social, scientific and technological developments. Universities from across Europe are members of the association, which is registered as a non-profit making organisation in Belgium. The intention behind establishing the association was the recognition that education and research within the field of Society, Science and Technology should be strengthened.

ESST is part of a relatively new research tradition which focuses on the interrelationships between social, scientific and technological processes. The basic characteristic of this tradition is an insistence on the necessity to think about social and economic circumstances in order to understand the evolution of science and technology. The development of science is often seen as an essential autonomous process; a process of gradual accumulation of knowledge, driven by purely internal imperatives, such as the search for truth. Technology has been seen largely as a process of applied science, a kind of "lesser cousin", which simply followed on from previous scientific advances. Science was conceived as opening fields of knowledge which engineering exploited.

This began to change the in the 1950s and 1960s: a new approach emerged, which regarded scientific activity and tech-
nological change as deeply embedded in our society. The argument was that understanding the development of science and technology involved the recognition that internal scientific and technological advance occurs in the context of powerful social and economic forces, which shape both the development of science and technology and the impact of any advances. This tradition insists that a study of the evolution of science and technology must include social, political, cultural and economic dimensions. This involves a multidisciplinary approach which ESST was established to promote.

The ESST programme is international in its outlook: it is a multicultural venture rooted in the teaching, research and scientific cultures of many European regions and countries, and in their wider social experience. The universities have developed a common graduate course focusing on the social, scientific and technological developments in Europe, which they teach in collaboration with each other. This involves substantial exchange of students and staff from the participating universities.

**MA in society, science and technology in Europe**

The ESST education consists of two curricula: one for postgraduate students, the other for professionals with at least five years' working experience. ESST research is carried out within society, science and technology subjects between partners within the network or between ESST members and other
institutions.

**International collaboration**

The member universities of the ESST association are:

- Facultés Universitaires Notre dame de la Paix Namur
- Université Catholique de Louvain
- Vrije Universiteit Brussel
- Roskilde University Centre
- University of East London
- University of Tampere
- Université Louis Pasteur
- National School of Public Health Athens
- University of Bari
- University of Siena
- Netherlands: Universiteit Maastricht
- University of Oslo
- Technical University of Lisbon
3.12. NORWAY

- Universidad Autonoma Madrid
- Universidad del pais Vasco/Euskal Herriko Unibertsitatea
- Ecole polytechnique fédérale de Lausanne

3.12.2 Norwegian Institute for Studies in Research and Higher Education, Oslo

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<tr>
<th>Name</th>
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Profile

The history of the Institute goes back to the late 1950s as a group within the Norwegian Research Council for Science and the Humanities, NAVF. Through over twenty-five years of activities, the Institute has gained considerable expertise in issues
related to research and higher education nationally and internationally. The Institute is a key actor in delivering statistics, studies and research in these areas.

The Institute was associated with NAVF until the foundation of the Research Council of Norway, NFR, in 1993. On January 1st, 1996 the Institute became an autonomous non-profit public foundation and Norwegian was added to its name. The change of name and new status do not indicate a change in the Institute’s activities. NIFU continues to work on research and higher education in the form of statistics, studies, evaluation and research.

The Institute is financed by the Research Council of Norway through a basic appropriation and programme funding. Additional funding is for contract research mostly for the Council, various ministries, universities, colleges, the Nordic Council of Ministers, the EU and the OECD.

The Institute is a multidisciplinary institution. Half of our researchers are political scientists or sociologists, others are economists, natural scientists, technologists and humanists. Our library is the most extensive in the field of science policy studies in the Nordic countries.

Sections

The Institute has four sections:
• Section 1: R&D Statistics and Resource Analyses

This section collects and aggregates national data on expenditure and personnel for research and development (R&D) at universities, colleges and research institutions outside the higher education sector including a register of R&D personnel. The section makes analyses and presentations of statistics and indicators for national and international reports based on this material. Director of Research: Kirsten Wille Maus

• Section 2: Science Policy Studies

Work in this section includes the evaluation of research, research programmes and research institutions in the autonomous institute and business enterprise sectors. The section also carries out studies on research organisation and research policy on both national and international levels. Director of Research: Egil Kallerud

• Section 3: Institutions of Higher Education

Studies on university and college systems, including organisation and personnel, the need for and recruitment of researchers, and educational policy for this field make up the work in this section. Director of Research: Svein Kyvik

• Section 4: Study Conditions and Student Flow
Activities in section 4 include studies on the recruitment of students and student flow, how graduates adapt to the labour market, studies on higher education graduates, and the evaluation of higher education. Moreover, the section participates in the national evaluation of the reorganisation of the upper secondary school system. Director of Research: Per Olaf Aamodt

Communication

NIFU has its own project report series. Staff also publish in domestic and international scientific journals and elsewhere. We issue a quarterly magazine Forskningspolitikk (Research Policy) with almost 7,000 subscriptions, and the annual publication Utdanning og arbeidsmarked (Education and the Labour Market) which covers current educational and labour market problems. R&D statistics and S&T indicators are published every second year. Director of Research, Hans Skoie is senior editor of Forskningspolitikk. He also has special responsibility for the seminars arranged by NIFU on special topics, often with international experts. Furthermore, the Institute arranges conferences where researchers, politicians, leaders and administrators in the public and private sectors participate.

Our publications are presented on the Internet. Moreover, a catalogue of research institutes and institutions as well as Forskningspolitikk are available. However, most of the docu-
ments are in Norwegian only, but we plan to publish more in English. Currently available:

- *Research on Higher education* An overview of current research activities on higher education at NIFU

### 3.12.3 Studies in Technology, Innovation, and Economic Policy, Oslo

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**Profile**

The STEP Group is a research institute working on the economic and social policy implications of a knowledge-based society. The group consists of sixteen researchers and four associates, based in Oslo, Norway.

The STEP group was established in 1991 to support policymakers with research on all aspects of innovation and technological change, with particular emphasis on the relationships
between innovation, economic growth and the social context. It was initiated by the Royal Norwegian Council for Scientific and Industrial Research (NTNF), which since early 1993 has been a component of the new Research Council of Norway. Since 1994 the group has been an independent foundation located in the centre of Oslo. STEP Group now receives a core grant from the Ministry of Regional Affairs. STEP is a permanent contractor to the European Commission and is currently carrying out three research projects for DG XII. In addition, STEP carries out contract research for a wide range of clients.

Objectives and approach

The primary objective of the group is to identify and research core issues for modern innovation policies. The basis of the group’s work is the recognition that science, technology, and innovation are fundamental to economic growth and social development. Yet the context of research, innovation, and economic policies has changed sharply in recent years, and this new context presents new challenges.

The new policy context results from a number of related technological and economic developments. Firstly, there have been major scientific and technological changes, particularly in generic technologies such as IT, materials, and – most importantly – molecular biology and biotechnology. Secondly, there have been profound changes in the economic policy environ-
ment — integration of capital markets, rapid growth in direct foreign investment, deregulation, and general internationalisation. There have been serious economic problems: persistent budget deficits and unemployment in the advanced economies, and continuing poverty and deprivation in much of the developing world. Thirdly, environmental problems and constraints have become much more severe.

Finally, there have been significant shifts in our understanding of the relationships between science, technology, and the economic and social world. In the past, relationships between science and society have often been thought of in an oversimplified way. In particular, it has often been suggested that scientific discovery is a precondition for innovation, and that social and economic innovations are based primarily on research activity. Recent research has however emphasised the fact that knowledge creation and innovation are far more complex than this simple approach. Two results of modern research on science and innovation are particularly important. The first is that the creation of new technological knowledge may often involve research, but it is not necessarily based on research. The second is that the creation of knowledge, and the process of innovation (both in industry and the wider social system) involves interaction and feedback between different types of actors, and different social institutions. In particular, innovation does not result simply from a transfer of knowledge from the science system into applications. Such insights have been the driving force be-
These developments mean that policy-making has entered a new phase. On the one hand, science and technology policy can no longer be thought of purely in terms of research policy. That is, policy-makers are looking beyond research programmes which aim simply at the development of new scientific and technological principles and results. It is necessary to focus also on the interactive creation and use of science and technology, by companies and by society as a whole. This leads directly to a need to know more about the distribution of knowledge, and about the role of non-research factors in innovation processes. At the same time there is at present an increasing emphasis on the social and economic relevance and impact of research, and on the factors which shape this impact. All of these considerations pose serious challenges for innovation policy-makers. The primary objective of the STEP Group is to explore the implications of these multi-faceted changes.

What kinds of approach are relevant to analysis of the policy challenges of the new economic and technological context? Our view is that technological change must be seen as endogenous to economic processes, as one component of the drive for competitive advantage by firms. In searching for new products and processes, firms are in effect introducing variety into the system, often in circumstances of great turbulence and uncertainty. This introduces an evolutionary element into economic
dynamics, and the group therefore takes a broadly evolutionary perspective on economic change. At the same time, it is clear that firms rarely innovate in isolation; on the contrary, they work within complex networks or systems of knowledge creation, which include universities, research institutes, regulatory bodies, and other public agencies. We therefore tend to take a systemic view of innovation, which makes no sharp distinction between public and private, but which focuses on the scope and characteristics of public-private interactions. This means that members of STEP tend to approach problems of the creation of technology from a framework which strongly emphasises the social and economic context of innovation as a basic determinant of both the direction and content of innovation.

3.12.4 Centre for Technology and Culture, Oslo

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Profile

The Centre for Technology and Culture (TMV) was established as an acknowledgement of the fact that people today face challenges which require an awareness of the role that technology plays in society and culture. Research into and development of technology are central aspects of social development and represent human, social and cultural challenges to the general systems of values and norms in our culture.

The main goal of the Centre is to create a professional academic environment which contributes to and stimulates study and debate on a national basis around the problems of value related to technological development. TMV also aims to encourage investigation into the significance of technology for contemporary culture and the history of culture, the consequences of technology for the standard of living and the environment, developmental problems in an historical perspective, ethical problems related to research and the development of technology, and values and attitudes in society today.

TMV is a programme which is organised as a research centre, with the aim of conducting and stimulating research and communication about the relationship between technology and human values in society. TMV was established in 1988 by means of a state budget appropriation. In 1994 the Centre was made part of the University of Oslo, and it is expected to continue in its present form until the end of 1998. TMV will then be
evaluated and a decision will be made as to whether the Centre or parts of it are to be continued, and if so, within which organisational framework. TMV is an interdisciplinary centre, but is most closely related to the humanities.

3.12.5 Centre for Technology and Society, Trondheim

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<th>Name</th>
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<tr>
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<td><a href="http://www.ntnu.no/sts">http://www.ntnu.no/sts</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Dr. Knut H. Sørensen</td>
</tr>
</tbody>
</table>

Profile

The Centre for Technology and Society (STS) is part of the Norwegian University of Science and Technology (NTNU) in Trondheim. It was established in 1988 to be responsible for teaching and research in science and technology studies. STS is an interdisciplinary unit with a strong basis in history and sociology. Intellectually, it has developed from Norwegian tradi-
tions of economic history and working life research. However, at present, the research and teaching at STS reflect the international development of constructivist approaches. This means a strong focus on empirical investigations, even if theoretical efforts are also appreciated.

A major part of the research efforts at the centre is concerned with the historical and cultural dimensions of modern technology. Thematically, there are two clusters: energy, transport and the environment, and information and communication technologies. One major strand of research is investigating political and cultural controversies in these technological areas. Another has focused on the role of users, with particular emphasis on the concept of domestication of technologies. Lately, much effort has been put into analysing the political roles of technology, not just to assert that there is a politics of technology, but rather to explore constructive political use of technologies.

The long-standing interest of the centre in the analysis of use of technologies has also meant a sustained effort to explore the gender dimension. The analysis of the mutual shaping of gender and technology has been a focal point of research at the centre, leading to some of its major intellectual contributions. STS is organised together with NTNU’s Centre for Women’s studies, and the activities in the area of gender, science and technology will be carried out in collaboration with the two centres.
Efforts in the area of science studies have been less marked, but this is a growing area. Ongoing research covers the interrelation­ship between local science and local culture, the changing meaning of the usefulness of science, domestication of scientific knowledge, the nature of interdisciplinarity, and scientific biographies.

The Centre has 3 permanent staff members.

**Education**

Studying at STS in Trondheim means pursuing a graduate or doctoral degree in either history or sociology. The student will thus get training in the discipline of history or sociology. The training in science and technology studies is mainly done through thesis supervision, but also through seminars and workshops at the centre. STS has regularly hosted international workshops with participants from the leading science and technology studies communities in Europe and the US.

Through courses and thesis work, students are also exposed to a rigorous training in qualitative methods of history and sociology. STS has a strong international orientation and is heavily engaged in trans-national research projects in Europe, as well as scholarly collaboration with major institutions in Europe and North America.

**Degrees:** Cand. polit. and dr. polit. in sociology, cand. philol. and dr. art. in history.
The dr. polit. and dr. art. degrees are equivalent to an international PhD, the cand. polit. and cand. philol. degrees are extended master’s degree programmes, formally estimated to be two years full-time study.

**Costs and admission criteria**

The admission criterion is: bachelor’s degree or similar with a major in either sociology or history.

Study costs in Norway are estimated at around NOK 65,000 a year. There is no tuition fee.

**International collaboration**

The Centre collaborates with:

- University of Twente
- University of Edinburgh
- Danish University of Technology
3.13 Portugal

3.13.1 Escola Superior de Biotecnologia, Porto

<table>
<thead>
<tr>
<th>Name</th>
<th>Escola Superior de Biotecnologia Universidade Católica Portuguesa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Rua Dr. A. B. de Almeida</td>
</tr>
<tr>
<td></td>
<td>4200 - Porto, Portugal</td>
</tr>
<tr>
<td>Phone</td>
<td>(02) 5580070/76</td>
</tr>
<tr>
<td>Fax</td>
<td>(02) 5580072</td>
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<tr>
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3.13.2 Higher Institute of Labour and Business Studies, Lisbon

<table>
<thead>
<tr>
<th>Name</th>
<th>Higher Institute of Labour and Business Studies (ISCTE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Av. Das Forças Armadas, Room 138 P - 1600 Lisbon, Portugal</td>
</tr>
<tr>
<td>Phone</td>
<td>+351 1 790 30 04</td>
</tr>
<tr>
<td>Fax</td>
<td>+351 1 790 30 05 or +351 1 790 30 71</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:paula.almeida@iscte.pt">paula.almeida@iscte.pt</a></td>
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<tr>
<td>WWW address</td>
<td><a href="http://www.iscte.pt">http://www.iscte.pt</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Paula Almeida</td>
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Profile

The ISCTE (Instituto Superior de Cincias do Trabalho e da Empresa - Higher Institute of Labour and Business Studies) is a University Institute with activities in the broad areas of social and business sciences. It is located in the northern part of Lisbon in the Cidade Universitaria (University Campus) together with the main Faculties of Lisbon University. Its premises are currently in three blocks: the ISCTE building, the Autonomous Wing (Ala Autnoma), and the INDEG/ISCTE building.
3.13. PORTUGAL

Education

ISCTE was founded in 1972 and it offers one of the first management degree programmes in Portugal.

Degrees in Sociology and Social Anthropology were created in 1974 and 1982 respectively, both being the first degree programmes in these subjects to be offered in Portugal. In 1989 the degree in Information Systems and Management was introduced, followed in 1993 by degrees in Industrial Engineering and Management and in Sociology and Planning. In 1994 programmes were introduced in Social and Organisational Psychology and in Economics.

At present ISCTE offers the following courses:

- Graduate Level: (4-year or 5-year degrees)
  - Business Organisation and Management
  - Information Science and Business Management
  - Industrial Engineering and Management
  - Human Resources Management
  - Sociology and Planning
  - Anthropology
  - Social and Organisational Psychology
  - Economics (Development Economics and Policies)
- Modern and Contemporary History

- Post-Graduate Courses: (2 year degrees)
  - MBA Business Management
  - MSc Global Management
  - Finance
  - Information Systems Management
  - Anthropology
  - African Studies
  - Urban Design
  - Policies of Human Resources Development
  - Social and Organisational Psychology
  - Contemporary Social History
  - Communication, Culture and Information Technology
  - Sociology of the Territory
  - European Societies and Policies
  - Industrial Sociology

The academic staff currently totals around 326, of which 195 are in the area of Management.
The departments include the teaching staff working in a scientific area. Within the Unit of Management there are the following departments:

- Department of Sciences and Information Technology
- Department of Management Sciences

The total number of Faculty staff is 195, of which 6 are full professors and 7 are associate professors. A large number work in firms, being at ISCTE on a part-time basis.

Research activities are carried out within UNIDE (the Business Development Research Unit), which co-ordinates and supports all research projects in the field of Management.

Post-graduate teaching is done at INDEG-ISCTE (Institute for Development of Business Management), an organisation established jointly by ISCTE and various large Portuguese and international firms as well as an association of small and medium-size firms. INDEG-ISCTE has its own premises.

**International collaboration**

In the field of Management, ISCTE participates in several student exchange programmes within Europe (Erasmus and Tempus programmes) and also outside Europe. ISCTE has relations with American, African and Asian universities. A MBA pro-
gramme is jointly organised in Macau (Asia) by ISCTE and the University of Macau.

### 3.13.3 Instituto Superior de Economia e Gestão, Lisbon

<table>
<thead>
<tr>
<th>Name</th>
<th>Instituto Superior de Economia e Gestão</th>
</tr>
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<tbody>
<tr>
<td>Address</td>
<td>Rua do Quelhas</td>
</tr>
<tr>
<td></td>
<td>6 - 1200 Lisbon, Portugal</td>
</tr>
<tr>
<td>Phone</td>
<td>(01) 3953151</td>
</tr>
<tr>
<td>Fax</td>
<td>(01) 600393</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:ira@iseg.utl.pt">ira@iseg.utl.pt</a></td>
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<td><a href="http://www.iseg.utl.pt/">http://www.iseg.utl.pt/</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Ilídio Antunes</td>
</tr>
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3.14 Russia

3.14.1 Centre for Science Research and Statistics, Moscow

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<tbody>
<tr>
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<td>11, Tverskaya Street</td>
</tr>
<tr>
<td></td>
<td>Moscow 103905, Russia</td>
</tr>
<tr>
<td>Phone</td>
<td>(7-095) 229 4740</td>
</tr>
<tr>
<td>Fax</td>
<td>(7-095) 9242828 / 8820587</td>
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<tr>
<td>Email</td>
<td><a href="mailto:Sokolov@statsc.msk.su">Sokolov@statsc.msk.su</a></td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Dr. Sokolov</td>
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</tbody>
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Profile

The Centre for Science Research and Statistics was established in 1991 under the auspices of the Ministry of Science and Technological Policy of the Russian Federation and the Russian Academy of Sciences. It combined groups of scholars from government research centres and academic institutes specialised in R&D statistics, policy studies, forecasting, and related areas.

The main objectives are:

- to develop R&D and innovation statistics in the Russian
CHAPTER 3. INSTITUTIONAL INFORMATION

Federation, to supply policy-makers with comprehensive, up-to-date and internationally comparable data

- to analyse and forecast trends in S&T
- to make recommendations on development and implementation of the national S&T policy
- to publish and disseminate statistical data, analytical reviews and policy studies to inform Russian and international communities on the national S&T system in Russia.

**Higher education**

The higher education in Russia is closely related to the S&T system. That is why the CRSR pays attention to analysis of trends and situation in the higher education system. The Centre’s studies cover infrastructure of higher education institutes, economic mechanisms and financing of higher education, system of postgraduate training, R&D performed in universities.

The centre provides regular sociological studies related to S&T and education in Russia. Special efforts are devoted to monitoring public opinion on S&T.
International collaboration

The centre has established close collaboration with a large number of international organisations, among which the OECD, the European Union, and UNESCO. The centre is moreover member of the European Association for Studies of Science and Technology EASST.

3.15 Spain

3.15.1 University of the Basque Country, Bilbao

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<tr>
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<tbody>
<tr>
<td></td>
<td>Departamento de Sociologia 1</td>
</tr>
<tr>
<td></td>
<td>Facultad de Ciencias Sociales</td>
</tr>
<tr>
<td>Address</td>
<td>Apartado 644, 48080 Bilbao, Spain</td>
</tr>
<tr>
<td>Phone</td>
<td>34 (9) 4464 7700 ext. 2214</td>
</tr>
<tr>
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<td>34 (9) 4464 8299</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:cipolrom@lgdx04.lg.ehu.es">cipolrom@lgdx04.lg.ehu.es</a></td>
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<tr>
<td>Contact Person</td>
<td>Mikel Olazaran</td>
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</tbody>
</table>

Profile

NECSTS students coming to the University of the Basque Country can stay in the Department of Sociology 1 (Bilbao)
or in the Institute for Logic, Cognition, Language and Information (ILCLI, San Sebastian). Students staying in one of these centres can attend the courses taught in the other centre. There is a continuous bus service between Bilbao and San Sebastian. Travel time is about one hour.

The aim of the Technology, Organisation and Innovation (TOI) Research Group in the department of sociology in Bilbao is to study the interplay between technological and organisational factors in innovation processes. Currently the TOI Group is working in two main areas:

- **Information technology and organisational change:** The main focus of interest of the Group is the study of the organisational dimensions and effects of the innovation processes related to the development, implementation and use of information and communication technologies (IT) in firms and organisations. Case studies are being carried out in firms and organisations from different sectors (industrial, services, and public sectors).

- **Science and technology policy and innovation systems:** Another main focus of current interest is the study of regional innovation systems and science and technology policies. The TOI Group is studying the origin and evolution of science and technology policy in the Basque Country since the early 1980s.
The Institute for Logic, Cognition, Language and Information (ILCLI) in San Sebastian is a centre for multidisciplinary research in the fields of language, cognition, information and communication. Its Unit of Social Studies of Cognition, Science and Technology is devoted to the analysis of the social dimensions of cognition, science and technology from a multidisciplinary perspective. STS-related lecturers and researchers at ILCLI include: Xabier Arrazola (Social action: co-operation, negotiation), Begona Asua (Sociology of organisations), Jesus Ezquerro (Philosophy of technology), Inaki Heras (Economics of technical change; organisational change), Jesus M. Larrazabal (Logic applied to computer science and artificial intelligence; Reasoning; Social action), Mikel Olazaran (Sociology of science and technology; Sociology of organisations), Luis A. Perez-Miranda (Planning: decision, practical reasoning).

**Education**

In the University of the Basque Country the academic year is divided into two semesters. The first semester starts in late September and ends in early February. The second one goes from mid-February to the end of June. Exams are in early February (first semester) and late June and early July (second semester). There are short vacation periods (between 10 and 14 days) in both Christmas and Easter. Postgraduate courses usually have 20 hours (2 credits). Some may have 10 (1 credit) or
30 hours (3 credits). Students are usually expected to participate in the sessions, do some reading and carry out and defend a written essay.

The Department of Sociology 1 of the University of the Basque Country has a Doctoral Programme focused on social change (work, technology, space). The Doctoral Programme of the Dept. of Applied Economics 1 of the University of the Basque Country (Bilbao) usually includes courses about the economics of technical change. The language of these courses is Spanish. In the Doctoral Programme of the Department of Sociology 1, UPV-EHU, there are several courses about social theory and social research methods.
3.15.2 Centre for Scientific Information and Documentation, Madrid

<table>
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<tr>
<th>Name</th>
<th>Bibliometrics Department Centre for Scientific Information and Documentation CINDOC</th>
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<tbody>
<tr>
<td>Address</td>
<td>Joaquín Costa 22 28002 Madrid, Spain</td>
</tr>
<tr>
<td>Phone</td>
<td>34 1 563 55 60</td>
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<tr>
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<tr>
<td>Contact Person</td>
<td>Isabel Gómez</td>
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</tbody>
</table>

Profile

The Centre for Scientific Information and Documentation (Centro de Información y Documentación Científica, CINDOC) is one of the almost one hundred research institutes that compose the Spanish Scientific Research Council (Consejo Superior de Investigaciones Científicas, CSIC), that is the largest Spanish research institution active in an extensive range of scientific fields. CINDOC main area of activity is Information Science, both in Science & Technology and in Social Sciences & Humanities. It offers several specialised training courses and information ser-
vices and develops different research lines.

The Bibliometrics Department of the CSIC/CINDOC has been working in quantitative studies of science and technology since the mid 80s. Its activity comprises two different and complementary levels:

• Basic level.
  
  – Development of new bibliometric indicators especially focused on the assessment of research performance in the non-central and non-English speaking countries like Spain and Latin-American countries.
  
  – National and international scientific co-operation and its influence on research activity.
  
  – Bibliometric studies at the micro level: identification of research groups with bibliometric tools and study of their structure and dynamics.
  
  – Scientometric approaches to the study of interdisciplinarity in science.
  
  – Mobility of scientists

• Applied level.

  – Bibliometric studies on the Spanish scientific activity are developed by request of different national
or regional institutions involved in Science Policy tasks. Among other areas, Pharmacology, Immunology, Materials Science, Biomedicine, Plant & Earth Sciences and Environmental Sciences have been studied.

- Quality assessment of Spanish scientific journals.
- Development of interactive electronic information systems for scientometric indicators.

The bibliometrics department has 8 permanent staff.

Education

The CSIC/CINDOC is a research institution; it is not able to grant any degree. However, the institute has some doctoral students that carry out research conducive to the elaboration of PhD that are presented at the Universities.

The Bibliometrics Department of the CSIC/CINDOC participates in some postgraduate courses in collaboration with the Information Science and Library Science Department of the Faculty of Social Sciences (Universidad Carlos III) of Madrid. **Master Degree in Information Science** (Universidad Carlos III)

The Bibliometrics Department of CSIC/CINDOC offers also training in three optional courses of 10 to 20 hours each for
obtaining the **Ph.Degree in Information Science**, at the Universidad Carlos III de Madrid.

**Costs and admission criteria**

- Master Degree in Information Science: 650,000 ptas
- Optional courses for the Ph Degree in Information Science: 3,500 ptas per 10 hours

For both courses one should be a postgraduate student.

**International collaboration**

The Bibliometric Department is member of the following organisations:

- Sociedad Española de Documentación Científica (SEDIC)
- Red de Investigadores en Ciencia, Tecnología, Economía y Sociedad (RICTES).
- European Association for the Study of Science and Technology (EASST)
- Red Iberoamericana de Indicadores de Ciencia y Tecnología (RICYT)
Institutions with which we cooperate:

- Universidad Carlos III de Madrid (Spain).
- Universidad Complutense de Madrid (Spain).
- Instituto Municipal de Investigaciones Médicas de Barcelona (Spain).
- Hungarian Academy of Sciences in Budapest (Hungary).

### 3.15.3 Research Unit on Science and Technology Policy, Madrid

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</tr>
<tr>
<td>Phone</td>
<td>C/ Alfonso XII, n. 18</td>
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<td>+ 34 (91) 521.9169/521.9028</td>
</tr>
<tr>
<td>WWW address</td>
<td>+ 34 (91) 521.8103</td>
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<tr>
<td>Contact Person</td>
<td><a href="mailto:rustep@iesam.csic.es">rustep@iesam.csic.es</a></td>
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<td></td>
<td>Prof. Luis Sanz Menendez</td>
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</table>
Profile

The Spanish National Scientific Research Centre (CSIC, Consejo Superior de Investigaciones Científicas), established in 1939, is an overarching interdisciplinary organisation that carries out research through its one hundred institutes. The CSIC, the largest Spanish research institution, has various institutes, centres and units dealing with social sciences and policy analysis.

At CSIC there are two main institutes carrying on research activities in science, technology and innovation studies: the CSIC Institute for Advanced Social Studies (Instituto de Estudios Sociales Avanzados, IESA) and the CSIC Scientific Information Centre (Centro de Información y Documentación Científica, CINDOC).

The CSIC/IESA was created in 1988 to develop research activities in Social Studies, Comparative Politics and Public Policies. A group on science and technology studies and research policy started work in 1991 under the name of Research Unit on Science and Technology Policy (RUSTEP). The CSIC/CINDOC has since the mid-eighties a bibliometric department that has been involved in research in the field of scientometrics, mainly applied to science and technology policy studies. Both groups are part of different departments and work together in many projects and activities.

The aim of RUSTEP at CSIC/IESA is to contribute to the
increase of knowledge in the field of science technology and innovation studies, through the analysis of the structures and dynamics of change of the research and innovation systems and through the understanding of the behaviour of research and innovation actors (firms, laboratories, institutions, governments etc.). At the most practical applied level of knowledge production we could mention the development of exercises of evaluation and assessment of the policies and programmes for science, technology and innovation.

The main research areas of RUSTEP are related to the study of science, technology and innovation policies (at the national and regional level) and the evaluation of RTD programmes.

Among some specific research activities recently developed are: comparative analysis of the RTD priorities selection; evaluation, foresight and assessment for S&T policy planning; the role of human resources for science and technology, transnational mobility of scientists, public perception of biotechnology and the regulation of genetic engineering; social construction of research communities, specially molecular biology and biotechnology; international R&D Co-operation; international diffusion of science.

Scientific specialities

- Science and technology policy planning and evaluation of S&T Policies Research policy.
• Management of innovation and new technology.

• Social, political and economic studies of science and technology.

Current research interests are:

• National Systems of Innovation.

• Comparative Study of Science, Technology and Innovation Policies.

• Systems of incentives and regulation for encouraging innovation and RTD activities.

• S&T Policy Evaluation and Technology Foresight.

• Management of Technology.

• Entrepreneur and Innovation capabilities in laboratories and firms

• Historical development of research communities

• Public perception of science and technology, specially biotechnology.

• Risk assessment and regulation in biotechnology.
Education

The CSIC/IESA is a research institution; it is not able to grant any degree. But the Institute has some doctoral students that carry on research conducive to the elaboration of PhD Dissertations that are presented at the Universities.

CSIC/IESA researchers collaborate under permanent bases in some PhD programmes from the University Autonoma of Madrid, and are part of the teaching faculty of the ESST network (European Inter-University Association on Society, Science and Technology) in Madrid.

National and international collaboration

- European Inter-University Association on Society, Science and Technology (ESST).
- European Association for the Study of Science and Technology (EASST)
- Red de Investigadores sobre Ciencia, Tecnología, Economía y Sociedad (RICTES)
- University Autónoma de Madrid.
- University Carlos III of Madrid.
- PREST, Policy Research in Engineering, Science and Technology, University of Manchester.
- CSI, Centre de Sociologie de l’Innovation. École de Mines de Paris (France)

- CSSTS (Centre for Studies of Science, Technology and Society), University of Twente. Enschede (The Netherlands),

3.15.4 Institute for Prospective Technological Studies, Sevilla

<table>
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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Address</td>
<td>Isla de la Cartuja s/n E-41092 SEVILLA, Spain</td>
</tr>
<tr>
<td>Phone</td>
<td>34 95 448 8282</td>
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<tr>
<td>Fax</td>
<td>34 95 448 8274</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Gesa Auf der Heyde</td>
</tr>
</tbody>
</table>

Profile

The Institute for Prospective Technological Studies (IPTS) is one of the seven Research Institutes of the European Commission. These Institutes together make up the EC’s Joint Research Centre (JRC), which is the corporate research laboratory of the European Union with sites in Ispra (Italy), Geel
IPTS was conceived to promote technology foresight in support of EU policies. It was established in Seville in September 1994 and specifically created to help exploit technological change, in the broad policy sense, through a better understanding of the links between technology, economy and society. In fact, most of the work undertaken by IPTS is in response to specific requests for assistance from the European Union Institutions (mainly the European Commission services and the European Parliament), as well as to third party public or private organisations, within the framework of the competitive mandate given to the Joint Research Centre.

IPTS addresses a range of technological matters, especially where it is important to ensure a neutral and Europe-wide assessment of scientific and technological change. The Institute combines two perspectives in its work: a focus on emerging technologies, and a focus on socio-economic, policy-relevant options which involve technology. This unique partnership provides added insight, not only through empirical analysis of available data, but prospective exploration of the future characterising the specificity of the Institute's mission.

Currently, prospective studies at IPTS are developed exploiting synergy and cross-fertilisation in the following fields:

- Energy
CHAPTER 3. INSTITUTIONAL INFORMATION

- Environment
- Mobility & Transport and Industrial Technologies
- Information and Communication Technologies
- Life Sciences
- Regulatory Frameworks for Emerging Technologies
- Technology, Knowledge and Organisational Change
- Innovation, Diffusion and Growth
- Regional Development
- Resource Management
- Perspectives for Europe

International collaboration

To secure direct access to a wide range of experts, IPTS works in close partnership with a number of networks. The European Science and Technology Observatory (ESTO), is a network of 14 European, national, S&T organisations which share the responsibility for providing prompt access to information on scientific and technological change of socio-economic relevance.
To broaden its S&T scope, IPTS has also set up other formal and informal networks such as those established with S&T counsellors in European Commission's delegations around the world (US, Japan, Russia, etc).

### 3.15.5 IADE, Universidad Autónoma de Madrid, Madrid

<table>
<thead>
<tr>
<th>Name</th>
<th>Instituto de Administración de Empresas Facultad de Ciencias Económicas y Empresariales</th>
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<tbody>
<tr>
<td>Address</td>
<td>Campus de Cantoblanco Carretera Colmenar Viejo km 15 28049-Madrid, Spain</td>
</tr>
<tr>
<td>Phone</td>
<td>34 (91) 3974275</td>
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<tr>
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<tr>
<td>Contact Person</td>
<td>Isabel Alvarez</td>
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**Profile**

More than fifteen years after its creation, the University Institute of Business Administration (IADE) has become one of the most dynamic and prestigious business administration schools in Spain with an important international projection. For this
reason it forms a clear example of the capacity of public universities for developing and offering a wide range of third cycle training programmes to society in general and to the business community in particular, as well as lines of applied investigation that are up to date and of great quality. This is a target that has been reached in a period marked by dizzy change in all aspects of our environment. The University Institute of Business Administration (IADE) is a centre that is dependent upon the Autonomous University of Madrid (U.A.M.), dedicated on the one hand to scientific and technical investigation and providing assessment, within the scope of its area and, on the other hand, to the carrying out of educational activities within the third university cycle. Since it was set up in 1981, it has trained a large number of investigators, university professors and, especially, new businessmen, professionals and directors, both foreign and Spanish, in areas in which organisations and public enterprises are in most need of specialists. These are aspects that make it the first business administration school within the Spanish Public University system. In this way, IADE is a high quality investigative and training university centre with an international outlook that develops its activities within a context of excellence and innovation that is characteristic of U.A.M. These activities are brought about by means of a structure that is linked into six units: Banking and the Stock Exchange, Permanent Education, Postgraduate Studies, Energy, The Economy of Small and Medium-sized Enterprises (SMEs), and Aeronautical Man-
management. Each of these units undertakes the design and running of training, investigation and technological development programmes for the projects associated within their sphere of activity. The activities of these units are supported by the infrastructure of the three divisions within the Institute – Study, Investigation and Technological Development – which provide professional and technical resources, information, and access to public and private entities, both Spanish and foreign.

**Permanent Education Division**

IADE, through its Permanent Education Division, takes on the task of organising regular continuous training programmes for those companies and institutions that request recycling courses for their employees in any of its fields of knowledge. Similarly, it supports other national and foreign teaching centres or institutes in imparting Master’s programmes and other postgraduate courses, both through technical assistance courses as well as through its own professors. Since its creation, the Division has collaborated fully with Spanish, European and Latin American institutions, teaching centres and universities.

**Masters Degrees**

The IADE provides master’s programmes for Spanish and foreign postgraduates and professionals who are looking for an
excellent level of training in line with real business needs and through connections with other foreign universities, which allows it to offer its students periods of practical work in companies and international studies. At present the IADE offers the following programmes:

At present the IADE offers the following programmes:

- Master of Business Administration (M.B.A.)
- Master of Accounting, Financial and Economic Auditing (M.A.C.)
- Master of Bank Management and Administration (M.D.B.)
- Master of Science, Technology and Society. European Science Society and Technology (M.C.T.S.)
- Master of Business Administration and Management. Development of Directors Programme. (M.D.D.)
- Master of Aviation Business Management (M.B.A.A.)

Once the minimum required credits have been obtained (1 credit is the equivalent of 10 hours of study), and the corresponding thesis or monographic work has been presented and approved, the students will obtain their Master’s title under the
Conditions of admission

Given that the number of places is limited there is an Admissions Committee that establishes, in each case, the minimum criteria of competence for the selection of applicants which ensures a certain level of homogeneity and guarantees the good results of the master's programmes.

Master in Science, Technology and Society / M.C.T.S.
European Science Society and Technology (ESST)

A joint programme of postgraduate training in which another twelve European universities take part and the objective of which is the training of professionals who are conscious of the interactions between science, technology and society, are capable of pushing forward the technological development that concerns us and who can transform it into greater economic growth and social development.

The focus of the programme is interdisciplinary, combining the results of the most recent investigations in scientific studies, technology and society from the point of view of European issues, historical perspectives or economic and political aspects.

The Master of Science, Technology and Society (M.C.T.S.), which has a duration of one year, is structured in two cycles. In the first, consisting of 210 hours of study, a common curriculum is developed for all the universities and it is a requirement that a competence test be passed at the end. The second cycle takes
place at a university which is determined in accordance with the area of specialisation that is taught there and which the student will have previously applied for. IADE offers as a specialisation the "Strategic Management of Innovation and Technology" (80 hours of study plus a practical period within a company), which is given by investigators, professors and professionals in private companies and in the Public Administrations.

Master in Aviation Business Administration / M.B.A.A.

Directed towards university graduates who wish to direct their activities towards an aeronautical field, or towards professionals with experience in economics within an aeronautical environment, the objectives of this programme are to provide the necessary knowledge associated with company management techniques that are typical of the aeronautical industry, as well as informing the student about its legal peculiarities techniques and economics so that they can take on the overall management of a company within the industry.

The programme tries to tackle the changes that are being experienced by air transport and its associated industries, taking advantage of similar experiences that have occurred in other countries and their subsequent evolution, which requires that the professionals in the sector have the most up to date knowledge in management techniques in order to develop an efficient company management role within a highly competitive environment.

It consists of a total of 480 hours of study structured into
monthly modules which the student can complete in a maximum period of three years.

The Master of Aviation Business Administration (M.B.A.A.) is the only postgraduate course that specialises in the management of companies within the aeronautical sector and has been developed by the Autonomous University of Madrid in collaboration with the State Society for Aeronautical Education.

**Doctorate Programmes**

The investigative capabilities within IADE have allowed us to put three doctorate programmes in place whose objectives, entry requirements and levels of demand and dedication are comparable to those currently applied in the most prestigious national and international university centres.

By developing these doctorate programmes, the IADE - in accordance with its own mission statement - hopes to offer society a group of graduates with the maximum academic levels who will contribute effectively to the resolution of the problems that are already taking form for the forthcoming century. This will to contribute to the harmonious development of Spanish society and the Spanish economy, taking into account its international coordinates, is affirmed by tight and fruitful collaboration with leading companies in the financial and energy sectors. With a strict respect for the parameters of scientific excellence
that serve as a framework for their activities, this collaboration means that IADE can offer the companies and society a series of useful reflections directed towards improving their activities within different seasonal environments.

**Doctorate Programme in Strategic Energy Management and Economics.**

This programme aims to analyse the structure of the markets, the strategies of the companies and the regulations of the energy sector and, in particular, the electrical energy sub-sector, which means that participants will be investigators with an interest in the sector and company directors who are concerned about having a full understanding of the sector from the point of view of up to date strategic management.

Specifically, a scientific analysis of the present and future make up of the energy sector is carried out and the characteristics of its companies’ management is studied, as well as organisational and technological aspects. Candidates should complete a total of 32 credits and favourably present a doctoral thesis in order to obtain the title of Doctor. This programme is given within the framework of the collaboration agreement between the ENDESA Group and the Autonomous University of Madrid which has lead to the creation of the Seat of Strategic Energy Management and Economics in IADE.

Candidates should complete a total of 32 credits and favourably present a doctoral thesis in order to obtain the title of Doctor. This programme is given within the framework
of the collaboration agreement between the ENDESA Group and the Autonomous University of Madrid which has lead to the creation of the Seat of Strategic Energy Management and Economics in IADE.

**Doctorate Programme in the Economics and Management of Scientific Innovation and Policies.**

This Doctorate provides an offer of interdisciplinary and inter-university training that allows the development of investigations into subjects related to technological innovation from an economic perspective, an offer that has not previously existed within Spanish universities. The content of the programme is structured around the following areas or fields of study: an economic analysis of innovation and technological change, company strategies with regard to innovation, management and evaluation of innovation and science, technology and society: technological policies. Candidates should complete a total of 32 credits and favourably present a doctoral thesis in order to obtain the title of Doctor. This programme is organised thanks to the help of the educational units of the three Madrid universities.

**Investigation Division**

The IADE carries out important investigative activities in tight collaboration with Spanish and foreign institutions. These activities are structured around different lines of investigation in
response to the working and teaching experiences of the investigative professors in IADE and are focused towards the demands of the market. Each of the projects or investigative contracts that take place in IADE are set within the framework of one of those large areas of knowledge and are carried out by our experts in the subject. The structure of the investigative activities of IADE, broken down by current lines of investigation, are as follows:

- Management and organisation
- Economics of Small and Medium sized Enterprises (PYME)
- Strategic Energy Management and Economics
- Financial Economics and Accounting
- The Technologies of Information Systems and Management Simulators
- Science, Technology and Society

Publications

The IADE has its own line in scientific publications which allows it to divulge the more interesting results of the investigations that take place within the institute. The IADE Documents
are published in two series: Company Administration and Energy Studies, in response to the more prolific lines of investigation in the case of Company Administration, or to those lines of investigation that due to their specific nature or application within the sector, in the case of Energy Studies, deserve an independent edition.

**International Programmes**

The Institute has established international exchange programmes with students and professors from other European and Latin American postgraduate university centres. More specifically, on a European level and within the Socrates programme it has agreements with notable business schools. These agreements allow us to offer students study periods abroad, with the possibility of them taking advantage of scholarships which are offered by the European Union for this purpose, as well as establishing joint lines of investigation in different areas of knowledge. Currently the institutions that are associated with our programmes are the following:

- Fachhochschule Pforzheim (F.H.W. Pforzheim)

- Scuola di Amministrazione Aziendale (S.A.A.) (Università Degli Studi di Torino)
• Groupe Ecole Supérieure de Commerce de Grenoble (E.S.C. de Grenoble)

• Groupe Ecole des Hautes Etudes Commerciales du Nord (E.D.H.E.C) (Université Catholique de Lille y Nice)

• Groupe Ecole Supérieure de Commerce de Nantes Atlantique (E.S.C.N.A.)

• Institut d’Administration des Entreprises de Bordeaux (I.A.E.)

• Universidade Autónoma de Lisboa

• Brighton Business School (University of Brighton)

• Universidad de Córdoba

• Universidade de Pernambuco

• Universidad del Cono Sur de las Américas (EDAN)

• Economics of the Small and Medium Sized Enterprise (PYME) Unit

The Institute has wide experience in the training of new businessmen and in the support of strategies and projects for the creation of new companies.

For this, it develops its activities along the following lines:
3.16 Sweden

3.16.1 Nordic Center for Innovation in Lund

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<tbody>
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Profile

Nordic Center for Innovation

Since its creation in 1984, the Nordic Centre for Innovation operates as a consortium of specialists involved in furthering science, technology and industrial and other innovation. The Centre should earn respect in academia, business, and politics.
by pioneering efforts to understand the rapidly changing world economy and, particularly, the dynamic positioning by the five Nordic countries in the process of globalisation.

The Nordic Centre for Innovation supports trans-disciplinary research on international economic competition and the development and application of advanced technologies. Attention is focused on various ways by which competitive advantages are created and how these may influence international economic, technological and other relations. Simultaneously, the Centre seeks to understand how the Nordic countries can sustain their own economic development and maintain international competitiveness.

The Centre diffuses research results and business intelligence to energise public policies and corporate strategies. For many years, the Centre’s researchers and other specialists in industrial innovation have contributed also to the public discourse on policies and business strategies among the Nordic countries as well as in the rest of Europe.

**Developing policies and strategies**

Through its regional network of scholars, planners and other specialists the Centre develops public policies and corporate strategies for science, technology and industrial and other innovation. The guiding principle behind the Centre’s many activities is to foster compelling policy and strategy initiatives of
importance to the economies of the Nordic region. Through its international contacts, the Centre breeds inventive ideas for decision-makers in the public and private sectors. In such processes, the Centre is able to offer strategic visions for a new venture, alternative conceptual designs, a 'road map' for reaching the goals, and definitions of the operational objectives. The Centre could provide the human resources needed to support a ministerial agency, a company management, or a university department. In short, the Nordic Centre for Innovation helps generate, initiate and diffuse innovations. Only rarely, however, is the Centre engaged in the actual implementation of particular programmes or other initiatives. The Centre functions more as a catalyst for new initiatives and as a medium for discourse. It is not designed and staffed to be an implementing agency, engaged in routine work or traditional administrative duties.

Opening up for new venues and creating new linkages

The Nordic Centre for Innovation has pioneered a wide variety of new initiatives among the Nordic countries in support of innovative product design in industry; regional and national industry policy; high-tech trade; regional and national science and technology policies; corporate strategies for industrial renewal; evaluation studies of large high-tech projects and programmes and their methodology; indicators for science, technology and innovation; human resource development, incl. ad-


vanced training and postgraduate educational programmes in industrial innovation, etc. Moreover, the Centre has organised international and regional conferences, and an extensive visitors programme of specialists in these and related areas from countries like China and Japan, and regions like North America and South East Asia. The Centre has brought these specialists in contact with colleagues in the Nordic countries. Most of the many activities once performed by the Nordic Centre for Innovation are now the responsibility of others. The Centre remains a small, but effective catalyst of future-oriented activities.

**Sharing responsibilities across sectors and national borders**

The Nordic Centre for Innovation is formally organised as a non-governmental body - a non-profitmaking organisation - funded by contracts over several years with government agencies and by industrial firms in the Nordic region and elsewhere. Moreover, the Centre receives funds and other resources on a project-by-project basis from international organisations like the European Union and the United Nations Industrial Development Organisation. At present, the Centre is managed by a secretariat in Sweden as part of rotating responsibilities among the five Nordic countries. To foster a spirit of collaboration across national frontiers, the main secretariat for the Centre is later to be moved to Denmark, where the Centre started to operate as a regional organisation fourteen years ago.
3.16. SWEDEN

**Education and training**

In accordance with its research profile - management of technical change and innovation; entrepreneurship and small-scale business development; corporate strategies and business intelligence; public policies for technology and innovation; and human resources development - the Centre has created and supported specialised education and advanced training in a variety of STI-related ventures. These programmes are being offered in English for three target groups: Doctoral (or Ph.D.) students, Master’s students, and professionals (in the private or public sectors). According to its operating principles, the Centre serves as an initiator of such programmes, assisting a partner in the design and early implementation. The management of the educational and training programmes (such as the ones listed below) is carried out by academic and other units.

**Doctoral programs:**

- Conceptual design and assistance in the implementation (incl. financial support) of the first six years of an international doctoral program in Technology Policy, Innovation and Socio-Economic Development. Partner: Roskilde University (Denmark).

- Implementation of the first year of the European Doctoral Program in Entrepreneurship and Small Business Development. Partners: Copenhagen Business School (Den-
mark), Lund University (Sweden), and Vxj University (Sweden).

- Assistance in the design and implementation of the first two years of the Australian national doctoral Program in Science, Technology, and Economic Policy. Partners: Australian National University and five other universities in the country.

**Master’s program:**

- The conceptual design and the development of a master’s program in Innovation and Technology Management. Partners: Australian National University, Asian Institute of Management (Philippines), University of the Philippines at Diliman.

**Specialized programs:**

- Design and implementation of course programs and roundtables for public sector professionals and decision-makers in management of innovation and technological change: ”Public policies and business strategies for science, technology and innovation”. Partners: Australian National University and BRIE (University of California at Berkeley).
3.16. SWEDEN

- Design of a course program for private sector managers and other business professionals in management of innovation and technological change: "Business strategies, management of technology, and product development". Partner: Copenhagen Business School (Denmark).

3.16.2 Section of Science and Technology Studies
Gothenburg

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<td>Contact Person</td>
<td>Kerstin Thonfors-Olsson</td>
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Profile

The first roots of the research and training activities carried out at the unit can be traced back to the mid-70s, a time when the relationship between technological and social change was attracting an intense public and scholarly attention in Sweden. In
the late 80s, a more permanent and comprehensive programme was launched. The group has gradually developed a theoretical understanding on the nature and impact of technological development in line with the constructivist approaches today strongly represented in the international STS community. Empirically, the bulk of research has so far been focusing on transportation technology.

At present, the unit is again expanding both in terms of size of teaching and research staff and in terms of scope of the empirical areas covered. The development of a new programme on information technology is under way. One of its sub-areas will be the development of micro-sociological studies and ethnographies of technical practices and design (this will be done in collaboration with a university-based information science institute). Another area will concern controversies or changes in discursive patterns around the phenomenon of "expertise" as emerging out of the present information technology promotion programmes in Swedish municipalities.

The unit has 9 researchers, of whom 3 PhD students.

Education

As the only university department in Sweden, the section offers an STS core module course on all three levels - basic, extended and advanced. The admission criteria stipulate that the students accepted for the higher levels normally should have passed their
3.16. **SWEDEN**

exams on the lower level(s). In addition to this there is a specific profile course concerning "automobility" in a humanistic perspective. These courses are all held in Swedish. The number of students are increasing. A new syllabus for a postgraduate programme is implemented during 1998. In connection with this courses in English, available for international students, will be outlined in detail. They are scheduled to be running from the spring 1999 at the earliest.

**International collaboration**

The section is a member of NECSTS, Network for European Centres on Science and Technology Studies, co-operation within the frames of the SOCRATES programme. At Nordic level, there is a collaboration ("Nordlink") with colleagues in e.g. the STS centre at Trondheim (Norway), the Centre for Studies of Technology, Culture and Human Values at Oslo University (Norway), the Department of Technology and Social Change at the Linkping University (Sweden) and the STS groups at the Danish Technical University in Lyngby and at Aalborg University (Denmark).
CHAPTER 3. INSTITUTIONAL INFORMATION

3.16.3 Department of Technology and Social Change, Linköping

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<tbody>
<tr>
<td>Address</td>
<td>University of Linköping, Sweden</td>
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<tr>
<td></td>
<td>Professor Boel Berner</td>
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<td>Associate Professor Jane Summerton</td>
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Profile

The Department of Technology and Social Change is a problem-oriented, interdisciplinary graduate school, in existence since 1970. At the Department the relationships between technology and society are studied from various perspectives, e.g. economic, social, political and cultural, and in both historical and contemporary settings. Students are admitted every second year for a five-year fully paid, full-time programme, including course work and the writing of a doctoral thesis. Ten to fifteen students are admitted from a large number of applicants, which include students from other countries than Sweden.
Research in the department is organised in four research programmes, each with 20-30 students and researchers.

- **Systems of Innovation** - The program has two main foci:
  
  1. regional and national systems of innovation and
  2. research policy. The overriding purpose of the programme is to explore relationships between technical, economic, organisational and institutional change.

- **Technology and Culture** - The programme studies the interactions between technological development, culture and thought. Areas of interest include the critical study of the notion of "cultural heritage", analysis of the historical understanding of "modernity", and studies of the theory and practice of social engineering.

- **Technology, Practice and Identity** - The research of the programme has three main foci: gender studies, studies of actors and practices in various technological settings (particularly in high-risk environments), and analysis of socio-technical networks/systems (particularly energy systems).

- **Man, Information Technology, Society** - The programme centres on three main areas which are analysed with
special emphasis on the role of information technology: technology and everyday life, rhetorics of technology, and large technical systems.

The strong points of the department lie in these research areas which means that the department has a uniquely broad and varied profile. Research work includes many different approaches, disciplines and epistemological perspectives. The programmes should not be seen as separate entities, but function as "home bases" for the Department’s scholars. There is substantive interaction also between the programmes, and a continuous renewal of the focal points of each programme.

The Department is a part of the larger Tema Institute, with six other interdisciplinary departments, focussed on the areas of: Water in nature and society; Health and Society; Communication; Child Studies; Gender Studies, and Ethnicity and international migration.

Education

Degrees: Ph.D. and Master’s degrees are given (Master’s degree only in certain years)

Students interested in problems of technology and society will find at the Department a rich and varied environment with considerable experience in the field, a strong seminar tradition and a culture of intensive support and supervision in their grad-
uate work. Students may also appreciate the material benefits of the Department, with a full-time salary for five years, an office, a computer, strong incentives for international exchange and possibilities for studying abroad, etc.

Description of the teaching system:

- Master’s Degree in "Technology and Social Change" - a one-year study programme consisting of course work (first semester) and the writing of a master’s thesis (second semester). Admission in September every second year.

- Doctoral Degree in "Technology and Social Change" - an extensive study programme (four-five years’ duration) which leads to a Ph.D. degree. The programme consist of two parts: course work and a Ph.D. thesis. The first term of the PhD programme consists of a number of compulsory courses. During the second term, the PhD students choose individual courses, while also formulating their thesis topics. The last three years are devoted to thesis work. Admission in September every second year. Next admission for PhD students in September 1999 (application date April 1999). The Ph.D. course work is organised around two core modules: Technology and Culture, and Technology and Society. Each module consists of several individual courses.
 Costs and admission criteria

A B.A. in relevant areas is required, including an examination paper in a subject or problem area. Interviews are conducted with a short-list of applicants.

The costs are not high: only Student’s Union membership dues.

International collaboration

In Scandinavia, most contacts have been with:

- the Department of the History of Technology, Science and Industry at the Royal Institute of Technology, Stockholm, Sweden

- the Department of Technology and Society, Trondheim University, Norway

- the Department of Technology and Human Values, Oslo, Norway
3.17 Switzerland

3.17.1 Center for Technology and Management
Zürich

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Profile

The Center for Technology and Management (CTM) is a joint undertaking of the two Swiss Federal Institutes of Technology:

- ETHZ - Eidgenössische Technische Hochschule Zurich
- EPFL - Ecole Polytechnique Fédérale de Lausanne

The Centre for Technology and Management (CTM) is a joint undertaking of the two Swiss Federal Institutes of Technology:

ETHZ - Eidgenössische Technische Hochschule Zurich
EPFL - Ecole Polytechnique Fédérale de Lausanne
CHAPTER 3. INSTITUTIONAL INFORMATION

The Centre for Technology and Management (CTM) was founded jointly by the two Swiss Federal Institutes of Technology, ETH Zürich and EPF Lausanne. It provides an organisational umbrella for executive development activities, interdisciplinary research, and networking among industry and academic leaders. An alliance has been formed with IMD Lausanne to run the programme Leading the Technology Enterprise.

The basic mission of CTM is to build a research base for leadership in a technology-intensive 21st century.

CTM’s uniqueness stems from its ability to combine outstanding faculty resources from technology and management, and to take on the pioneering work which cannot be done in either technological or management institutions alone. It also provides a unique bridge between practices and the development of new theories and concepts.

Research

CTM research activities focus on six main "leadership" topics at the junction of technological, managerial and humanities disciplines:

- Technology “forefronts” and their likely impact on industry structures and competition.

- Strategic management of technology.
• Technology-based enterpreneurship/start-ups.

• Large public/private infrastructure financing and project management.

• Sustainable development.

• Leadership development for technology-based enterprise.

Programme Leading the Technology Enterprise

“A technology-intensive 21st century will require a new organisational breed - able to lever up on technology and combine these competences with the broader competences needed for leadership. Hence the alliance between IMD, and the two Swiss Federal Institutes of Technology.”

Four areas of competences will be needed:

• An integrated and complete mastery of core business competences such as marketing, operations, innovation, finance, accounting and control and of course “people management”.

• General management competences, with a particular focus on technology as a fundamental element of strategic decision-making, organisation, implementation and change.
• The mindset and ability to lead globally. This includes multi-cultural as well as business competences.

• A personal leadership philosophy which aims at achieving high business performance with the simultaneous satisfaction of broader individual, stakeholder, and societal needs. This will require a profound philosophical commitment to market competition, to winning, and to leadership which is devoted to achieving unprecedented new levels and forms of value creation.

Recent participants came from a large number of multinational companies.

### 3.17.2 Center for Management of Technology, Lausanne

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<td>Jean Micol</td>
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3.17. SWITZERLAND

Profile

The CMT is an interdepartmental Centre of the Swiss Federal Institute of Technology in Lausanne (also known as Ecole Polytechnique Fdrale de Lausanne - EPFL). It is made up of members representing some key competences at the EPFL.

Its mission consists of providing high level services in the area of technology management, innovation valorisation and associated processes. These services are provided to individuals (students, engineers and managers), to private and public enterprises, in partnership with the various EPFL departments, the industry and other well known institutions.

Education

The educational/training programmes associated to the Center for Management of Technology address two types of audiences:

- The students in engineering and architecture of the EPFL (available only in French)

The training programme for students in engineering and architecture of the EPFL provide the necessary basis allowing future graduates to manage technological project and be able to grasp its interdependence with other sector of activities such as those associated with the legal, financial, marketing and human resources aspects, etc. The
training in "Technology Management" combined with that provided in "Social Sciences" make up the education provided in "Science-Technology and Society" (STS). A project completes the education provided to the EPFL students. All together this represents about 10

- The engineers and managers in industry

There are two training programs for engineers and managers in industry:

- "Postgraduate Program in Management of Technology" (MoT) - Entrepreneurship & Innovation
- "Leading the Technology Enterprise" - (LTE). For further details please refer to the Center for Technology and Management (page 289).

The "Postgraduate Programme in Management of Technology" (MoT) is targeted at university graduates in engineering or business with a minimum of professional experience, and at Ph.D candidates. Focusing on Entrepreneurship & Innovation, its objectives are to develop the necessary competences for the creation of new ventures based upon technological innovations. The EPFL and the Ecole des HEC of the University of Lausanne have jointly created this new programme. It is possible to maintain 60-80 training takes place in Lausanne.
Total programme length is one year. It includes 600 hours of training followed by 3 months of project work in a company. The training starts each year in January in Lausanne and a period at the University of Texas at Austin, USA. From September until December, the project work is carried out within a company.

**Degree:** Upon successful completion of the exams that follow each major theme, and the presentation of the project work, a postgraduate degree in Management of Technology (MoT) will be conferred jointly by the University of Lausanne and the EPFL.

**Costs and admission criteria**

The combined tuition for training in Lausanne and at Austin is Sfr. 12,000. Books/cases for the US (about US $ 200) and travel cost to and from the USA (about US $ 800 roundtrip) are not included. Cost of living is estimated at a minimum of Sfr. 1,600 per month in Switzerland and the USA.

Applicants holding a university degree in engineering/natural sciences or business/law, or an equivalent degree, must provide a complete application package including a curriculum vitae, a university degree transcript, references and a personal letter explaining the candidate’s motivation. Fluency in English is required. The application deadline is October 31 each year for the session starting in January. Admission is based
upon the application package and an interview that is required whenever feasible.

### 3.17.3 Swiss Federal Institute of Technology, Lausanne

<table>
<thead>
<tr>
<th>Name</th>
<th>Swiss Federal Institute of Technology</th>
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<tbody>
<tr>
<td>Address</td>
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<td>Phone</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Dr P. Rossel</td>
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</table>

**Education:** ESST MA Strategic Management of Innovation

The "European Inter-University Association on Society, Science and Technology" (ESST) consists of 15 universities which jointly seek to promote education and research programmes aimed at improving awareness and command of the necessary links and potential synergies between society, science and technology among decision-makers in Europe.

The first programme, set up in 1993, was the European Master in Society, Science and Technology. This is directed at young university graduates of all disciplines, and comprises 1 semester of general exposure to SST topics (through a common
programme already agreed upon) and 1 semester of specialisation, followed by fieldwork and completion of the Master's thesis. Each of the 15 universities offers 1 or 2 specialisations, giving the student the opportunity of selecting another site from which to accomplish his/her second semester. In 1993, 5 universities started in the first semester and 11 in the second, resulting in 73 Master's degrees being awarded in September 1994.

Meanwhile, the ESST Association has succeeded in organising the promotion of a similar programme for already active decision-makers - managers in both the private and public sectors. The EPFL-Lausanne has been selected as the location where the programme will be based, for a period of 3 years, before it moves on to Strasbourg, another site in the network.

The ESST II Programme "Innovation in European Business Corporations and Public Administration: a New Policy Approach" aims primarily at dealing with innovation dynamics and technological change. Favouring detours and lateral thinking when possible, it offers both instrumental and theoretical tools for coping with this complex field, but in such a way as to place this concern in a wider socio-economic framework, defined by the most critical issues facing Europe at the turn of the century: quality of life, unemployment, environmental deterioration, and migration pressure from the ever poorer Eastern and Southern countries of the world.

This ambitious approach is based on the paradoxical preoccupations, short- and long-term, local and global, competitive
and human-centred, with which decision-makers will have to familiarise themselves in order to contribute in a meaningful way to their community’s future.

With a highly modular course programme and a European network of experts supporting on-site, customisable Innovation Projects, the ESST II Programme leads to a Master’s degree or Specialisation certificates. ESST II wants not only to reinforce individual managerial capabilities to achieve global effectiveness, but also seeks to establish the necessary conditions for the creation of new, solution-oriented partnerships with a variety of socio-economic actors such as firms, public services at various levels, non-governmental organisations and research institutions.

The Master programme Strategic Management of Innovation is directed at managers in both corporate sector or public administration, providing key tools and services, to address successfully technological change, competitiveness, job market and sustainability issues:

- Wide choice of specialisations and flexible schedule
- Innovation Project in your own organization
- European network of lecturers and experts
- On-line teaching on Quality management
3.18. UNITED KINGDOM

Costs and admission criteria

A differential pricing system has been adopted, according to the cost of living in the various countries of the ESST network. Prices for non-ESST countries will also be defined on the basis of this list. For module, specialisation, and Master costs, please consult the updated price list.

Fees can be paid in a maximum of 4 instalments, over a period of time agreed upon in advance.

3.18 United Kingdom

3.18.1 Science Studies Centre, Bath

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<thead>
<tr>
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<tr>
<td></td>
<td>Department of Psychology</td>
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<td></td>
<td>Faculty of Humanities</td>
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<td></td>
<td>and Social Sciences</td>
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<tr>
<td></td>
<td>University of Bath</td>
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</tr>
<tr>
<td>WWW address</td>
<td><a href="http://www.bath.ac.uk/">http://www.bath.ac.uk/</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>David Gooding</td>
</tr>
</tbody>
</table>
Profile

The Centre exists to further research and training in the social and historical study of science and technology with particular reference to cultural change. Members of the Centre conduct research on a wide range of individual topics, but areas of particular interest are the sociology of scientific knowledge, the history, philosophy and sociology of experimentation, the social impact of science and technology and the development of 'intelligent' machines and other aspects of mechanisation. Current projects include studies of 'public experiments'; expert systems and artificial intelligence; the effects of funding restrictions on the direction of scientific research; the history of early electromagnetism; the impact of technology on life styles and the economic structure; the implementation of new industrial technology - especially computerised machine tools - and its effects on work organisation and industrial relations; gender-based perceptions of science; perceptions to health hazards arising from new technologies; the nature of medical and surgical skills; the relationship between 'western' science and technology and that of developing countries.

The Centre is well-established within the social studies of science and technology community. The Centre normally has about ten research students and a flourishing graduate seminar.

Members are active researchers who have been successful in establishing substantial research projects and in promoting
the study of science and technology and medicine in relation to society, wider aspects of culture, and the environment. Centre members supervise MSc and PhD projects, teach on the MSc's in Social Research, Environmental Science, Population and Planning MSc and also provide undergraduate teaching in Sociology, Psychology and History and Philosophy of Science for Natural Science students.

Cognate disciplines represented include: Sociology, Psychology, History and Philosophy of Science, Information Science (Computing).

Current research

Our main research interests tie in well with three research themes prioritised by the ESRC from 1997:

- Innovation, Organisation & Business Process
- Knowledge and Skill
- Communication and the Shaping of Technology
- Environment and Sustainability

Research Areas include the following areas of current and continuing interest:

- Lay and Expert Knowledge;
• Public Understanding of Science;

• Science, Culture and Communication,

• Information Technologies, esp. Modeling and Simulation and other Computational Methods and the Humanities and Social Sciences;

• Science, the Environment and Public Policy

Education

Higher degrees can be taken by either full or part-time research or through the M.Sc. in Social Research.

Studentships are available. Make applications to the Director.

From September 1997 all MSc courses will be fully modular and may be taken part-time over two or more years.

• The MSc in Social Research (Science Studies specialism). This MSc is project-based. Students may take the MSc as a self-contained 1-year programme or as the research-training year of a 3 or 4 year PhD. In the latter case, students who complete all requirements may be awarded the MSc during the second year of the PhD process.
• MSc in Science, Culture and Communication (Proposed). Information on this new MSc course will be available during 1997.

3.18.2 Management School Edinburgh, Edinburgh

<table>
<thead>
<tr>
<th>Name</th>
<th>Department of Business Studies, The University of Edinburgh Management School</th>
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<tbody>
<tr>
<td>Address</td>
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<td>Contact Person</td>
<td>Lorraine Edgar</td>
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</tbody>
</table>

Profile

All staff teaching in the Management School are active in research, a key part of the University of Edinburgh’s mission. We believe, uncompromisingly, that excellence in research should underpin management education, to provide the leading edge ideas for the future. Current research activity is included in teaching - through the use of examples, through course design and content, and through advice and research direction for dis-
sertations. Research is carried out in a number of overlapping groupings, research centres and programmes, and a set of teaching companies.

The Management School MBA programmes are amongst the top on offer in the country in terms of quality, with full AMBA accreditation. Student intake is of a similar high standard - bright, hard-working, motivated, enthusiastic, mature and articulate.

The programmes were established over two decades ago. The full-time MBA has over 100 students, of whom more than half come from around the world. The part-time MBA currently has over 300 managers participating in evening study.

Education

Full-time MBA Programme

The Edinburgh MBA is a general management course which covers all the main management disciplines and provides specialisation in Marketing, Finance, Operations Management and Entrepreneurship. It lasts for one calendar year.

Both the full-time and part-time courses are accredited by the Association of MBAs for the maximum seven year period. Only a minority of MBA providers has this distinction for all their courses. Students at The Management School are well qualified and have work experience in a wide range of management roles. The full-time Edinburgh MBA attracts students
from around 30 countries.

If you do not have a degree other qualifications and experience may be considered acceptable.

**Part-time MBA programme**

Thirty months. Eight terms. That is how long the Edinburgh part-time MBA programme lasts. For the convenience of students, the first term of year 1 starts in January. The course then follows the university terms (except the summer term which starts a week earlier). Each term covers a 10 week period with students normally attending two evenings per week - Monday through Thursday. Each session lasts for 2.5 hours (with a coffee break) and commences at 6.15pm. The Edinburgh MBA is a post-graduate degree. You would normally have a first degree (in any subject) or an equivalent qualification.

Among the courses given, three are especially focused on innovation:

- **Management of R&D and Product Innovation.** This course is concerned with product innovation in the research-based industries. It includes sessions on: the economic role of technological change, success in innovation, small firm innovation, strategy for innovation, organising for innovation, managing research and development, managing design, company-company collaboration, industry-university links, and public policy for innovation.
• Management Issues in Information Technology. The option takes a managerial approach to the changes in corporate opportunities which have taken place as a result of information technology in recent years. In some cases these changes have been brought about by improved technical performance; however in many cases that technical improvement has enabled a very dramatic reappraisal of the business which has had a much greater impact on its performance and results. The whole way in which business is conducted may have changed in certain industries.

• Management of Technology. This course introduces issues in the management of technology (the generation and commercial deployment of new products, processes and techniques). It explores the theories, methods, techniques, information sources, and agencies available for managing the implementation of technology.

Postgraduate Degrees by Research (MSc / MPhil / PhD)

The Department offers research degrees in most Business Studies disciplines, including the Management of IT, Organisational Studies and Industrial Relations, Marketing and Retailing, Management Science, and Finance and Business Economics. Areas of research interest are indicated in detail in the academic staff listings. Departmental research degree offerings include the MSc, the MPhil, and the PhD which require respec-
tively not less than one, two and three years of full time study or not less than two, three and four years of part-time study.

The Department has full ESRC Mode A recognition for its doctoral programme and ESRC RT recognition for its MSc by Research. This reflects not only its comprehensive research training regime, but also the quality of its facilities and supervision practice, the Department’s research environment (rating 4A in the recent RAE exercise), the volume of postgraduate research, and the completion rates of its students. Moreover, students participate in the wider University of Edinburgh community, particularly benefiting from contacts they establish at the Graduate School in Social Sciences. Most other Social Science departments at this University enjoy the same ESRC recognition, and most other University Departments have done well in the recent RAE exercise.

Doctoral students undertake a substantial research project that results in a thesis which should make a definite contribution to knowledge. Throughout the years during which this research is conducted, students will receive various forms of research training. This is particularly so at the beginning.

Costs and admission criteria

Applicants must normally have:

- First degree, or equivalent qualification (CA, CIMA,
membership of the Institute of Bankers).

- Minimum two/three years work experience.
- Aged 25+ (average age 30).
- Appropriate references preferably one academic and one work related.

Academic or professional references are essential. References from your friends or family are not acceptable. Any candidate may be also asked to interview.

Candidates who have neither a degree, diploma nor professional qualification are sometimes accepted provided that their performance on aptitude tests, at interview and their references and work experience suggest they are of graduate ability and standing.

**International collaboration**

The Management School responds to only a selected number of requests for International and Executive Programmes. It has been our policy, to date, to focus on The Edinburgh MBA in its two face-to-face modes of delivery. We are currently reviewing that policy and will be offering a selected range of tailored courses aimed at senior management level and designed to yield the maximum leverage from the managerial and research expertise of our staff.
Current experience with International and Executive Programmes includes:

- Lodz, Poland: Several projects over 5 years to establish a regional management centre.

- Moravia: Training of Management Teachers in selected specialisations.

- Schlumberger: Management education for engineering speciality around the world.

- Financial Services: A variety of in company programmes.

3.18.3 Centre for the History of Science, Technology and Medicine, Manchester

<table>
<thead>
<tr>
<th>Name</th>
<th>Centre for the History of Science, Technology and Medicine (CHSTM)</th>
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<tbody>
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<td>Address</td>
<td>Mathematics Tower, The University MANCHESTER M13 9PL, UK</td>
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<tr>
<td>Contact Person</td>
<td>The secretary</td>
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</table>
Profile

The Centre for the History of Science, Technology and Medicine (CHSTM) was founded in 1986 to bring together the University’s interest in history of science and medicine, and to act as a focus for the discipline in the Manchester region and beyond. It includes a large Unit for the History of Medicine, funded by the Wellcome Trust. It also includes the National Archive for the History of Computing, which we are developing as a resource for research in the history and culture of informatics.

The interests of Centre staff lie predominantly in 19th and 20th century history, mostly in Britain, Europe and the USA, but also including Chinese and Third World STM. History of medicine is well represented, along with biological and physical, chemical and mathematical sciences. We tend to focus on the social history of STM as it was practised, including a strong emphasis on history of technology. Several staff are interested in sociological approaches to STM, including comparative history. Literature and science is a common theme, as is a shared interest in artefacts and museums. Renaissance and early modern STM are also included, with a focus on the relation of music to medicine and natural philosophy.
Wellcome Unit for the History of Medicine

The Wellcome Unit for the History of Medicine in the University of Manchester was established in 1986. It is funded by the Wellcome Trust.

Since 1990 the Unit has taught an Intercalated BSc degree in history of medicine. The course lasts one year. Medical and dental students who have completed their second or third year of study are eligible to read this degree; and a number of grants are available from the Wellcome Trust.

Education

CHSTM offers a wide variety of undergraduate courses, and has recently launched two new, innovative postgraduate programmes -- an MA (Econ) in History and Social Anthropology of Science, Technology and Medicine; and an MSc in the History of Science, Technology and Medicine, which is built around a core of modules specially tailored to serve as a preparation for those who intend to research on 19th and 20th century STM. These courses are also open to part-time students, and to postgraduates who are looking for careers in technology, museums, or the media, as well as those looking to research.

CHSTM is keen to build its postgraduate programmes, for which studentships are available. We also welcome enquiries about postdoctoral fellowships and other visits.
MA (Econ) in the History and Social Anthropology of Science, Technology and Medicine

In recent years, it has become increasingly clear that social anthropologists and historians of science face similar problems in understanding how knowledge is constructed and put to use in specific social and historical contexts. This unique MA course aims to provide an interdisciplinary framework for exploring these issues. Drawing on the resources and expertise of the Department of Social Anthropology and the University’s Centre for the History of Science, Technology and Medicine, the course gives students the opportunity to study both Western and non-Western knowledge systems, to examine their differences and historical relationships, and to acquire a combined mastery of historical and anthropological techniques for their analysis.

The MA in the History and Social Anthropology of Science, Technology and Medicine aims:

- to give students a comprehensive introduction to important issues and key ideas in the history and social anthropology of science, technology and medicine
- to provide an opportunity to study particular topics of historical and anthropological significance in depth
- to encourage the development of analytical skills in understanding the changing form and function of science,
technology and medicine in society

- to encourage the development of writing and presentational skills of the highest standard

- to provide a comprehensive introduction to research methods in the history and social anthropology of science, technology and medicine

- to encourage the development and application of research skills in the use of historical materials

The programme is of 12 months' (full-time) or 24 months (part-time) duration, and is intended to bring students to an advanced level of knowledge in the discipline sufficient to enable those who so wish to proceed to a research-based degree course. Applicants should normally have obtained a first degree of at least 2:1 (or equivalent) standard.

The programme has received priority weighting for ESRC funding. Students whose main interests lie in the history and social anthropology of medicine are also eligible for Wellcome Trust scholarships.

As part of the core MA course, all MA students are required to attend the weekly Postgraduate Coursework Seminar in Social Anthropology. Students usually select two course units from CHSTM postgraduate modules. Students who wish to
take alternative courses have access to a large range of mod-
ules in allied departments.

Assessment of the MA is by submission of 3,000-word es-
says for each of the chosen modules, and by the submission of
a 10-15,000-word dissertation on an approved topic.

MSc in the History of Science, Technology and Medicine

The University of Manchester's Centre for the History of
Science, Technology and Medicine is committed to forging an
understanding of the emergence and development of modern
science, technology and medicine as the culturally dominant
ways of understanding and controlling nature. It also seeks
to develop teaching and research programmes of the highest
standard. In keeping with these commitments, this innovative
MSc course aims to provide a comprehensive historical intro-
duction to nineteenth- and twentieth-century science, technol-
ogy and medicine in their wider social, economic, cultural and
political contexts. It also offers systematic training in historical
approaches to a wide variety of scientific, technical and med-
ical knowledges and practices. The Centre deploys innovative
teaching and learning methods wherever possible.

The MSc in the History of Science, Technology and
Medicine aims:

• to give students a comprehensive introduction to impor-
tant issues and key ideas in the history of science, tech-
nology and medicine
3.18. UNITED KINGDOM

- to provide an opportunity to study particular topics of historical and contemporary significance in depth

- to encourage the development of analytical skills in understanding the changing form and function of science, technology and medicine in society

- to encourage the development of writing and presentation skills of the highest standard

- to provide a comprehensive introduction to research methods in the history of science, technology and medicine

- to encourage the development and application of research skills in the use of historical materials

The course is open and accessible to students from all backgrounds who wish to understand the historical development of science, technology and medicine and their roles in the modern world. Students are eligible for Wellcome Trust (history of medicine) and British Academy studentships. The programme is available for both part-time and full-time study. Applicants should have (or be about to obtain) a good undergraduate degree in any appropriate subject.

The core MSc programme is based on five 12-week modules designed especially for postgraduates. Each module involves one 2-hour lecture/seminar class per week.
Assessment of the MSc is by submission of essays for each of the above modules, by an examination and by the submission of a 20,000-word dissertation based on original research.

Students who wish to take additional or alternative courses have access to a rich variety of modules in CHSTM and allied Departments: CHSTM offers a wide range of courses in History of Western Medicine, History of Physical Sciences and Technology, History of Computing, History of Modern Biology, Chinese Medicine, and Race, Gender and Medicine. Social Anthropology includes specialists in Technology, Art and Medicine. History of Art staff share our interests in Social History, Representation, and the Body. The History Department offers advanced training in Cultural, British and European History.

**Postgraduate Study in History of Medicine**

CHSTM welcomes enquiries from intending postgraduates with a particular interest in History of Medicine. The presence in CHSTM of a large Wellcome Unit ensures that this specialism is well catered for. The Wellcome Trust offers studentships for our MSc in the History of Science, Technology and Medicine, and for the MA (Econ) in History and Social Anthropology of Science, Technology and Medicine. The Trust also awards generous scholarships for PhD students.
Collaboration

CHSTM enjoys close relations with a variety of Manchester University Departments including History, History of Art and Social Anthropology. We are housed alongside PREST (Policy Research in Engineering, Science and Technology) with whom we collaborate in studying contemporary history. We have close ties with UMIST, with the Manchester Museum of Science and Industry, with the Manchester Museum, and with Manchester Metropolitan University. There is a strong northern network linking Manchester with Lancaster, Leeds, York and Sheffield. We also have close links with the University of Pennsylvania (with whom we operate an exchange arrangement), Paris (INSERM U-158, Centre Koyre, La Villette) and Amsterdam (Science Dynamics and History of Medicine).

Manchester is rich in libraries, archives, museums and industrial archaeology. It can offer Britain’s best collection of academic and cultural attractions outside London. It also offers good countryside, excellent transport and convenient, economical living.
3.18.4 Centre for the Philosophy of the Natural and Social Sciences, London

<table>
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<tr>
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<tbody>
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<td>Address</td>
<td>Tymes Court Building</td>
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<tr>
<td></td>
<td>London School of Economics</td>
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<td></td>
<td>Houghton Street, London WC2A 2AE</td>
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<td>Phone</td>
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<tr>
<td>Fax</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Kate Workman</td>
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</table>

Profile

The Centre was founded in October 1990 and a generous donation allowed it to move into impressive new premises in Tymes Court in late 1993. Since then, the Centre has been actively organising conferences and seminars on philosophical issues arising in the sciences. It has also become a place for scholars to congregate and spend time discussing their work in a congenial environment. Along with the space and opportunities for organising these activities, the Centre has been gradually building up a range of research projects in the field, addressing questions in the Natural and Social Sciences both from a
foundational and from a practical point of view. In doing so the Centre works closely with the Department of Philosophy, Logic and Scientific Method, as well as with other LSE Departments.

The Centre for the Philosophy of Natural and Social Science aims to promote interdisciplinary research in fundamental questions of the natural and social sciences. This it does partly by promoting research into the important methodological and philosophical issues that arise, specifically, in biology, economics, medicine and physics. Projects in these areas have been running at the centre for several years. It also has a special interest in those methodological issues that arise when insights from both natural and social scientists are clearly needed to solve problems of practical concern. Some of its projects investigate, for example, the impact that knowledge acquired from the natural sciences affects policy making, and the role that different kinds of information play in economic models.

Research and workshops

Research projects currently underway in the Centre include work on Darwinism and the human sciences and on Darwinian studies of emotions; on measurement in physics and economics, on experimental economics and on economics and human values. There are also archival projects on Lakatos, and on in-depth video discussions with major philosophical figures in Philosophy today. The Centre also hosts a collaborative project
with the World Travel and Tourism Council.

Recent workshops at the Centre have covered a variety of topics in History and Philosophy of Natural and Social Sciences. The Centre also runs a flourishing Visitors Programme which has allowed distinguished scholars from North America and Europe to work with LSE scholars on topics of joint research interest and participate in the workshops. It publishes regular Discussion Papers and organises several lecture and seminar series - notably the Darwin Seminars and the All-London History and Philosophy of Science seminars.

The Derek Goldsmith Project

Darwinian ideas can contribute to the understanding of the evolution, role and function of emotions. From this launch pad, this project will study ideas about emotional disorders such as phobias, schizophrenia, depression and anxiety, as well as formulate empirical tests for modern theories of emotions, normal and pathological.

Economics and Human Values

In the past two years, this project has been concerned with topics at the boundary between economics and moral philosophy, by studying how the analysis of economic phenomena can be enriched by issues normally debated in quite different contexts. The project was begun with a year long series of seminars titled Honour, Honesty and Trust, where a group of distinguished philosophers, economists and political scientists spoke on the theme of the project by explicating their thoughts on the
3.18. UNITED KINGDOM

words contained in the seminar’s title.

Within the project the topics of interest include social choice theory and welfarism, game theory and social norms, freedom in economics, foundations of expected utility theory.

3.18.5 Centre for Research in Innovation and Competition, Manchester

<table>
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<tr>
<th>Name</th>
<th>ESRC Centre for Research on Innovation and Competition (CRIC) The University of Manchester and UMIST</th>
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<tr>
<td>Contact Person</td>
<td>Sharon Hammond</td>
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</table>


Profile

One of the main objectives of CRIC's research will be to cast new light on the problem of competitiveness and the role that innovation plays in this. We will be particularly concerned to explore this theme in the context of service activities and new forms of organisation for innovation.

The Centre draws upon the expertise of the Graduate School in Economic, Social and Legal Studies at the University of Manchester, and the developing Federal School of Management which brings together researchers from UMIST, Manchester Business School and the centre for Policy Research into Science and Technology (PREST). The research experience of PREST and CROMTEC (its parallel organisation in UMIST) provides one platform upon which the new centre will build an extensive programme of research.

In 1997, the Centre has made substantial progress towards its initial objectives. It has concentrated on carrying through the investments in infrastructure and academic development necessary to ensure the long term viability of its programme of fundamental work. At the same time, it has begun the process of engagement with industry, government and other user agencies.

The four thematic pillars are:

- New models of competition and their relationship to innovation and public policy
3.18. UNITED KINGDOM

- Innovation in services
- New forms of organisation and their relation to innovation and competition
- The comparative context of innovation and competition

The projects are:

1. Innovation Systems and Innovation Policy
2. Foresight
3. Technology Flows and the Service Sector
4. Trajectories of Demand as Influences on Patterns of Innovation
5. New Organisational Structures in Business Firms and their Effect on Innovation Performance
6. Measurement of Innovative Performance
7. The Systemic Context of Innovation and Competitiveness.

The centre has 12 researchers.
CHAPTER 3. INSTITUTIONAL INFORMATION

Education

CRIC is now in the process of establishing a PhD Programme in conjunction with the Graduate School of Legal Economic and Social Studies in the Faculty of Economic and Social Studies at the University of Manchester.

The PhD programme will take part around CRIC’s central research themes.

International collaboration

To further the development of the research programme CRIC will appoint Associate and Visiting Fellows who will work closely with CRIC staff in the development of the research programme.

Moreover, a panel of internationally distinguished scholars has been appointed to advise on the future development of the research programme and to advise on the relevance of the research plans and outputs.

Communication

An important part of CRIC’s overall strategy will be to develop policies to disseminate its work to a widespread user community and to interact with that community in whatever way supports the development of the research programme through dialogue and collaboration. Because of the diversity of potential
users of CRIC research there is no single route to effective dis­semination and dialogue. We will follow a number of routes to achieve effective engagement with different communities of users. On the one hand we will develop broad communication strategies which do not seek to target any particular audience, while on the other hand more focused strategies will be developed to have maximal impact on specific audiences. In some cases the latter will involve interaction with an audience over an extended time period.

There are four major audiences with whom CRIC needs to interact:

- Public and private companies
- Other private sector agencies including trade unions, professional organisations and pressure groups
- Government agencies
- Media, both general and specialist.
3.18.6 Centre for Research into Innovation, Culture and Technology, Uxbridge

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|                       | Brunel University |
| Address               | Uxbridge, Middlesex  
|                       | UB8 3PH, UK |
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| Fax                   | 44 1895 203155 |
| Email                 | crict@brunel.ac.uk |
| WWW address           | http://www.brunel.ac.uk/depts/cricht/ |
| Contact Person        | Michael Lynch |

Profile

CRICT aims to research into the social and cultural dimensions of science and technology in all its aspects, with particular reference to information and communication technologies. CRICT is concerned to develop and apply a research framework with a threefold significance:

- a fresh perspective on the nexus of problems around innovation, management of technology, technology transfer and technology assessment
- new insights into the problem of the relevance and utility
of social science research

- a framework for rethinking long-standing problems in social theory

CRICT recognizes the need to demonstrate the relevance and importance of social science research for those involved in making and using the new technologies. Accordingly, our contributions are aimed at two levels. We intend our research results to inform public debate and enrich the discussions upon which major governments and industry policy decisions are made. At the same time, we wish to promote closer relationships with practitioners so as to demonstrate the utility of social science for the practical business of designing, production and use of new technologies.

All projects share an "analytical skepticism" about the claims and achievements of science and technology. That is our approach is informed by a commitment to question taken for granted assumptions, particularly as these relate to "technical" matters.

This analytical skepticism finds expression in our pursuit of the central intuition that "culture" is a key factor affecting the design, production and use of technologies. Scientific knowledge and technological systems are to be understood as social and cultural artefacts, rather than as simply the linear or logical development from existing knowledge and technologies.
“Culture” affords a variety of interpretations relating to different aspects of the social, economic and organisational circumstances of production and use. Thus CRICT research asks questions about a wide range of aspects of science and technology, including human factors, organisational style, the representation of technical capacity, market dynamics, practitioner's attitudes and beliefs, company politics, designers' preconceptions about users. A central aim of our work is to assess the more valuable senses of “culture”.

CRICT hosts 8 permanent staff members.

Education

Degrees: PhD, MA and MPhil.

The CRICT PhD programme is designed to provide rigorous and multidisciplinary training and supervision in a range of research methods applied to the social and cultural dimensions of science and technology, with particular reference to information and communication technologies. The overall approach is one which reflects the multidisciplinary nature of the substantive field within which CRICT specializes. To this end we normally require CRICT PhD students to undertake a full year of formal postgraduate training prior to engagement with their thesis research proper.

The CRICT programme is unusual in its multidisciplinary base and the commitment to a formal taught first stage (one
year for full time students, two years for part time students). Students are usually registered for the degree of MPhil, subject to upgrading to PhD on the successful completion of Stage I.

Stage I involves the equivalent of an MA with courses in: research methods in social science, CRICT-specific research methods, and two further options chosen from a wide range. Upon successful completion of these courses (by examination and written work) students proceed to undertake an initial thesis of approximately 25,000 words as preliminary preparation for the transition to full research in Stage II.

Students who satisfy all requirements of Stage I will be permitted to proceed to Stage II; such students may elect not to continue their research at the end of Stage I and may be awarded with an MA (Social Studies of Innovation, Culture and Technology).

**Costs and admission criteria**

Applicants should have a first degree in a relevant subject area. These may include social sciences or more technologically-oriented disciplines such as computer science. The student must show a willingness to carry out research in a subject area relevant to work in progress within CRICT, and develop a suitable research proposal.

Current fees (1998/99) are British pound 2,610 per year, full time home/EU rate and British Pound 1,690 per year, part time
International collaboration

The department participates in the EASST network and with the Society for Social Studies of Science.

3.18.7 Centre for Research in Information Management, London

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<tr>
<th>Name</th>
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<tbody>
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<td>Ginny Batten</td>
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Profile

The mission of the Centre for Research in Information Management (CRIM) is quite simply: “To research and understand the strategic, management and organizational implications of information technology”.

We do this in six distinctive ways:

- Our work is empirical, usually fieldwork-based, examining leading practice and emerging issues.

- Our scope is international, investigating information management in both Europe and North America and also Asia.

- Our spirit is of partnership, working in companies, sharing issues, exchanging lessons and coming together at events.

- Our aim is to provide thoughtful and practical guidance to organizations and to contribute to knowledge in our publications.

- Our network comprises researchers from other leading business schools and in particular we collaborate on some projects and events with the Center for Information Systems Research at the Sloan School of Management, MIT.

- Our new offering is to make available some of the capabilities and activities of the i:LAB facility, launched in Spring 1997 at London Business School.

Our four principal lines of enquiry examine Strategy, Organization, Information and People in a Global framework. We
see integration of information and IT with business strategy as a fundamental challenge of the information age.

Information Management faculty are located within the Strategy group at London Business School. We are particularly concerned with the strategic exploitation, impact and management of information resources. Organization too is our concern, from understanding the new forms of information-based organizations to continuously developing principles of how to manage the IS function and IT activities. The primary source of value creation in the information age is Information itself. So we are concerned with developing concepts of information value and practical ways of realizing and creating it. Our work also focuses on the People involved, teams and individuals, both those involved in, and implicated by, information processing. All this work, where possible, is done on an international basis. The global economy is our laboratory, not just the UK or even the corporate headquarters of London!

In the next four years, research projects in progress or planned are:

- Development of Information Businesses
- Information-based Diversification
- The Role of the Chief Knowledge Officer
- The Evolution of Electronic Money
3.18. UNITED KINGDOM

• Cases in Knowledge Management
• Information Infrastructure
• IT Skills and Organization of the Future
• Measuring Information Resource Value
• Innovation in the Information Age
• The Economics of the Internet
• A Comparative Cross-Cultural Study of IT Management

Recent research topics include:

• Information Systems Strategic Planning Processes
• Strategies for Business Process Reengineering
• The Role of the Chief Information Officer
• Understanding Information as an Asset
• Transformation of the IT Function
• The Evolution of Electronic Markets
• Information Management Practice in Japan
• Building Knowledge Strategies
• The New IT Organization

• Experience of IT Outsourcing

3.18.8 Centre for Complexity and Change
Milton Keynes

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<tr>
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<tr>
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Profile

The Centre for Complexity and Change is a major innovation within the Faculty of Technology at the Open University. Launched at the beginning of 1998, it provides a new focus for the work of three existing inter-disciplinary areas, each of which has achieved an international reputation for excellence in teaching and research. The three areas, called Disciplines, are:
3.18. UNITED KINGDOM

- Development Policy and Practice (DPP)
- Systems
- Technology and Manufacturing Management (TMM)

The Centre will pursue inter-disciplinary and systemic approaches to the study of complexity and change, especially in the management of technologies, organizations, the environment and sustainable development in all parts of the world. Its work is particularly concerned with the impact of technological activities, the development of new technologies, and managing intervention, including forecasting and assessment, regulation and innovation. The emphasis is on taking an holistic view of situations, by considering the changing use of technology within its social, economic, cultural and institutional context. The aim of the Centre is to improve the understanding of complex situations involving technology and hence the decision making of people faced with change in such situations.

At the beginning of 1998 the Centre has the equivalent of 23 full-time central academic staff, 3 regional academic staff, 19 support staff, 3 research staff, 4 visiting professors and research fellows, and 17 full-time and 24 part-time research students. Members of staff come from a variety of academic disciplines including engineering, electronics, physics, agriculture, management, information technology, psychology, environmental
science, development studies and other social and policy sciences. This diversity is reflected in the range of courses they contribute to as well as their approaches to research and scholarship. In addition there are over 120 associate lecturers involved with the undergraduate and postgraduate courses associated with the Centre, whilst a further 40 or more people are employed as tutors for their residential schools.

Education

Degrees: MSc, MBA Technology.

The three constituent disciplines are the sites for the development, administration and promotion of teaching materials, courses and scholarship, while much of the research is undertaken in cross-disciplinary research groups.

The Centre provides a suite of open-entry courses using supported open learning techniques, which contribute to the University's modular Ordinary, Honours and Masters degree programmes. The degrees are structured on a credit system, with courses at three levels in the undergraduate programme (Levels 1-3 in the Credit Accumulation and Transfer Scheme operated in the UK). For the Ordinary degree, students require 360 CATS points at Levels 1 and 2; for Honours, a total of 360 - 480 CATS points, including at least 120 CATS points at Level 3, is required. A similar modular structure operates at postgraduate level (Level M in the CATS system).
The undergraduate courses in Systems are taken by large numbers of Technology students as well as some from other Faculties e.g. Social Sciences. The Systems Discipline also plays a leading role in the Faculty’s Level 1 provision. DPP’s undergraduate course (see below) gets a much broader intake since it is a University-wide course and constitutes half of the University’s undergraduate diplomas in Environment and Development and Gender and Development. The TMM Discipline’s main undergraduate contribution is in providing focus and direction for the Faculty’s new M.Eng. degree. The University is currently setting up named undergraduate degrees and it is hoped that the Centre’s courses will contribute to degrees in Engineering, Technology, Environment, IT and Computing, Business Studies and Development and International Studies.

At Postgraduate level, the Centre leads the Faculty’s provision through Diploma and Masters awards in Manufacturing: Management and Technology, Development Management, Environmental Decision Making and Technology Management. All of these postgraduate programmes are designed to respond to the need for continuing professional development in these fields. They make extensive use of cases drawn from a range of industrial, commercial, governmental and non-governmental organisations to illustrate the use of concepts and techniques, which can then be applied in the students’ assignments to their own situations.

As well as courses, members of the Centre have also pro-
duced study packs, books, journal articles and edited conference proceedings on a wide range of subjects.

**Costs and admission criteria**

The general rules of the Open University apply. The full-time postgraduate research particularly is supported by a well-developed programme of research training, presented in collaboration with other Faculties and totalling 1000 hours in the first year on a combination of research methods and subject-specific skills development. This programme is oriented towards the Science, Technology and Innovation area of ESRC funded studentships, and many of the full-time students are funded through collaborative ('CASE') studentships in this area arranged with private sponsoring organisations. A good honours degree is generally required to gain a funded full-time position, but it is possible to build part-time research programmes around employment or other experiential situations. The conduct of research demands high levels of motivation, creativity and initiative. Personal and intellectual support are essential, so that projects have to be aligned with the interests of the staff who supervise the project.
3.18.9 Centre for Science Studies and Science Policy, Lancaster

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The University of Lancaster |
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LA1 4YN, UK |
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| Contact Person  | L. Waite                 |

Profile

The Centre for Science Studies and Science Policy, founded in 1985, promotes interdisciplinary research within and across the boundaries of science, technology, and public policy. The Centre is perhaps best known for research which problematises the construction of scientific knowledge and expert authority and for the generation of innovative approaches drawing on traditions and perspectives from several disciplines. Collaboration between specialists in natural science, social science and the humanities is a key feature.

The Centre moves from the School of Independent Studies into the Social Science Faculty in August 1998.
Lancaster represents an especially stimulating environment in which to develop research in science, technology and policy. There are, for instance, significant opportunities to enhance and extend existing expertise across related departments - Sociology, History of Science, Philosophy, the Management School and Engineering - and in collaboration with Research Institutes, and Centres such as Women's Studies, the Centre for the Study of Environmental Change, the Institute for Health Research, and the Institute for Cultural Research.

Our strength lies in our number, the Centre is primarily made up of postgraduate researchers, and in the heterogeneity of the projects with which we are currently involved.

Education

The Centre for Science Studies and Science Policy, founded in 1985, promotes interdisciplinary research within and across the boundaries of science, technology and public policy. The Centre is best known for research which problematises the construction of scientific knowledge and expert authority and for the generation of innovative approaches drawing on traditions and perspectives from several disciplines. Collaboration between specialists in natural science, social science and the humanities is a key feature. As part of the Sociology unit of assessment, the Centre received a 5 star rating, (the highest available category) in the 1996 Research Assessment Exercise.
3.18. UNITED KINGDOM

The Centre has a well established PhD programme with 24 full and part time students, an MA programme in Science, Society and Nature, and research projects supported by the Economic and Social Research Council, DGXII of the European Commission, the European Science Foundation and the Engineering and Physical Sciences Research Council.

The diversity of empirical fields of study in CSSSP is paralleled by the diversity in theoretical perspectives that have been drawn on - and developed. For example, graduates and staff are contributing to theoretical debates within: social studies of science and technology (this includes actor-network theory) feminism (feminism, social constructionism and politics), social theory (debates relating to such figures as Bourdieu, Foucault, Latour, Beck and others). In this and other areas CSSSP is beginning to develop a reputation as a centre for innovative theoretical work.

Examples of PhD research topics and collaborating partners include:

- Use of computers in formal scientific modelling: Local authority responses
- to climate change (Local Government Management Board)
- Habitats and landscapes: scientific description and public perception (The National Trust)
• Scientific knowledge, expert authority and local government: the case of water fluoridation (The British Fluoridation Society)

• Enhancing public appreciation of uplands: social, cultural and environmental factors (English Nature)

• Environmental provision: young people’s expectations and active participation (Huyton Regeneration Partnership)

• Social and physical determinants of infant birth weight (Lancaster Acute NHS Trust)

• The role of heritage in the (re) production of national and European national identity (English Heritage)

• Urban lifestyles and sustainability: exploring new forms of public engagement with environmental experts (Groundwork Trust)

• Technical and political discourses in the management and development of Palestinian water resources

• Lay understanding interpretation and identification of risk factors in sudden infant death syndrome (Lancaster Acute NHS Trust)
3.18. UNITED KINGDOM

- The evolution and application of the precautionary principle in sustainable development (Friends of the Earth)
- Transport logistics, modal competition and regional economy (Transport 2000)
- Integration of environmental concern and policy formulation (Green Alliance)
- Heritage as a sense of place (English Heritage)
- Environmental provision: young people’s expectations and active participation (Huyton Regeneration Partnership)

Our overall objectives are to provide such students with:

1. A thorough grounding in the empirical and theoretical traditions of social studies of science and technology, including policy aspects;

2. Research skills pertinent to interdisciplinary work;

3. Confidence and skills in assembling and presenting research findings for both academic and non-specialist audiences.

To back our interdisciplinary approach, we have developed a training programme specifically designed to meet the needs
of students with different skills focusing on a relatively specialised field of work, drawing on perspectives and paradigms from various disciplines.

**Application procedure**

Interested students are asked to apply initially in the normal way by sending in completed application forms specifying their provisional research topics. Subsequently, the department will ask all applicants formally to develop their proposals, either as a normal or a CASE ESRC studentship. In the case of the latter, applicants will be asked to select CASE projects from those identified by the Centre and to provide a brief commentary outlining their own formulation of the key research questions, the relevant theoretical perspectives and methodology. On the basis of these commentaries, references, and qualifications, candidates will be invited for interview.

The Centre also runs an interdisciplinary MA 'Society, Science and Nature' which has been awarded ESRC recognition and a quota studentship.
3.18.10 Centre for Social Theory and Technology, Keele

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Profile

The Centre for Social Theory and Technology at Keele University is a leading research centre for contemporary social theory, organisation and technology.

The fundamental aim of the Centre is to foster first-class research and teaching in the social theory of technology and organisations. It is especially concerned with themes that foreground the special nature of contemporary technology-organisation systems. Using a range of theoretical approaches including cybernetic models, postmodern theory, complexity theory and chaos theory, it investigates the concepts of extension, scale, and partial connection in the context of questions
concerning:

- technology-organisation development;
- complexity and its theoretical & practical implications;
- new technologies and their knowledge bases, and their specific functions in different industries;
- the nature of cybernetic-based knowledge;
- the role of industrial design in technology-organisation development.

More specifically, the Centre aims:

1. To pursue innovative and high quality research and publication on the themes above.

2. To establish itself as an internationally recognised centre of excellence, and especially as an outstanding interdisciplinary 'think tank'. Accordingly, the aim is to shape intellectual debate in a range of social science disciplines but particularly in social theory applied to the analysis of technologies and organisations.

3. To attract visiting scholars including especially post-doctoral fellows on short- and medium-term visits.
4. To attract outstanding doctoral students from relevant disciplinary backgrounds.

5. To develop a research culture that bridges several Keele departments (including especially Sociology & Social Anthropology and Management) by organising working meetings, seminars and an annual international workshop.

Education

Degree: The Master of Arts (MA) Course

The CSTT is teaching the MA in Social Theory and Organisation ('Specialist Recognition' by ESRC). The MA in Social Theory and Organisation is available full-time (12 months) or part-time (24 months). It intended for students who have;

- a strong interest in organisation, identity, technology, knowledge, consumption, spatiality or belonging

- who would like to prepare themselves to write a doctorate from a strong interdisciplinary base

- or expect to apply contemporary social science as managers or consultants, and are looking for a more academic approach than is often found in Masters’ programmes
who wish to explore management theory in the context of contemporary social science knowledge.

The aims of the course can be summarized under three headings:

- Substantive: knowledge of major concepts, theories, literature;
  - To place the study of organisations within the wider context of social theory and developments in contemporary organisational analysis in order to understand the social and human implications of organisations and organising practices in the complex, uncertain and provisional conditions of the contemporary world.
  - To understand and analyse organisation as a generalised process in the modern world. This recognizes the interactive nature of organisations, technology and society and the need to think in terms of their active co-implication, and sensitizes the student to the increasingly interdependent character of social-organizational problems (e.g., ecology).
  - To familiarize students with new developments in organisational thinking to help realise (a) and (b) above, e.g., the relevance of information theory and
cybernetics to understand the increasing use of advanced communication/information technologies in organisations.

- Process: knowing how to use substantive knowledge. The course emphasizes the importance of developing a processual style of thinking in order to understand organisation as a generalised process in conditions of uncertainty and provisionality. Process skills, therefore are expressed through a "close-reading" of social and organisational issues in terms of ambiguity, part-wholeness, active division, undecidability, transformation, centre-periphery, fields of tension, betweenness, etc.

- Practical: the expression of substantive knowledge and process skills in seminars, papers, reports, etc.

In addition to substantive knowledge and process skills, the course underlines the need to translate these into communicable forms of research practice. Hence the need for the student to develop:

- Research Skills require the student to "read" a research situation/problem and decide on an appropriate research strategy/method (e.g., quantitative or qualitative; survey or ethnography; objective or participative; etc.). They also demand constant
self-reflection on the researcher’s role in relation to those "researched". Importantly, they call upon the practical application of the process skills described above to the design and interpretation of research.

- Writing Skills include the development of central concepts in written form; the articulation of a logically consistent argument; the ability to write for academic and for lay readers; and the ability to select and integrate relevant literature and ideas.

- Presentation Skills include oral, face-to-face presentation of research ideas, arguments, and research findings in small-group (seminar) and lecture settings; they involve the application of writing skills (see 3(b)) to oral situations, as well as familiarity with such communication aids as the overhead projector, flip chart, etc.

Costs and admission criteria

The PhD and the MPhil may be taken full or part-time. Unless you already have an MA or MPhil it usually takes three to four years to complete the PhD (five to six years for part-time students); MPhil training is usually one to two years (two to four years for part-time students).
3.18.11 Graduate Research Centre in Culture and Communication, Brighton

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Profile

The Graduate Research Centre in Culture and Communication (CulCom) provides institutional and intellectual support to researchers, faculty and postgraduate students working in a broad but coherent interdisciplinary environment. It is an environment defined by the activities of critical theorists and empirical researchers in the humanities and in cultural and social analysis.

Our shared concerns are with the defining character and historical origins of contemporary culture and society - and especially with the exercise of, and resistance to, power both in representations and institutional processes.

CulCom is concerned with the competing perspectives on,
and debates surrounding, cultural emergence and its expression in institutional processes and in everyday life. It is concerned with the politics of culture as they are played out through representations of gender, sexuality and ethnicity, and at the interface of local and global cultural formations. It is concerned with performance, display and consumption both in relation to material and non-material culture. It is also concerned with the institutional and technological dynamics of media and communication. And it is concerned, especially in the work of the Research Centre in Women's Studies, with the role of women in society and culture.

CulCom is developing a distinct research and teaching agenda relevant to a world of conflicting and fluid practices, identities and meanings; to their representation and expression in literature, music, art and other media; and to the social, political and economic processes in which they are rooted.

**Education**


CULCOM embraces a number of research centres including the Research Centre in Women’s Studies, Multimedia Re-
search Centre, the Centre for Urban and Regional Research and the Centre for Composition and Contemporary Music.

If you want to find out about the practicalities of research supervision in Culcom then check out the Web version of the CulCom Handbook, a copy of which is given to every new student and which is invaluable!

The European Media, Technology and Everyday Life Network, which is funded under the EU’s ‘Human Capital and Mobility’ Programme. Its aim is to stimulate, support and undertake research within the EU on the changing significance of information and communication technologies for the fabric of everyday life.

**Research Centre in Women’s Studies**

The Research Centre in Women’s Studies is part of the Graduate Research Centre in Culture & Communication at the University of Sussex. As well as offering research supervision for a DPhil in Women’s Studies (also available full-time and part-time) we also offer an MA in Women’s Studies (available both full-time and part-time).

The Research Centre in Women’s Studies offers doctoral supervision in many fields of gender research.

**Multimedia Research Centre**

The Multimedia Research Centre was established at the University of Sussex in January 1995 to bring together a group of researchers working in the area of new communications media and interactive multimedia. An MA in Multimedia is also
offered.

The Centre targets a neglected area of multimedia research and education: innovation in multimedia software, and the process of interdisciplinary collaboration in multimedia production. It will engage in research on the economic and technological dynamics of the industry, its political and regulatory context, and on specific new media technologies including their adoption and use in domestic, institutional and business settings.

This mission will be accomplished by bringing together courses on both the theory and practice of multimedia, a community of postgraduate research students, a series of externally funded research projects, and a number of shorter projects undertaken for industry and government. The Centre houses a Multimedia Laboratory equipped with state-of-the-art equipment for the production of multimedia materials for use in the mainstream processes of teaching and learning within a University setting.

These production facilities are complemented by clusters of open access multimedia PC workstations across the campus, managed by the University of Sussex Computing Service, and the Multimedia Teaching Centre, which is concerned with raising awareness of the role of multimedia in teaching and learning, and evaluating the potential application within Sussex of work done outside.
Programmes

CulCom offers a wide range of Masters programmes in culture and communication. The programmes are designed to provide an intensive and advanced course of study leading to careers in education, commerce and the professions as well as providing the essential training for further postgraduate work. The MA is a one year course (two for part-time students) and normally involves a mixture of taught courses and dissertation work. Applications are received until the end of July but early application (normally before the end of April) is advisable. Applicants will normally be considered from students with a 2.1 in their first degree, but students with other qualifications (particularly mature students) are welcome to apply.

Among the Masters programmes are an MA in multimedia and in women studies.

The MA in Media Studies (Multimedia) is a one-year full-time course designed as preparation for those interested in entering the multimedia industry, and for those who wish to study the field at an advanced level. The course aims to locate the emerging area of multimedia within the context of the academic study of existing media, and offer students hands-on experience.

Research supervision is available in various aspects of multimedia for students wishing to register for the degree of Master of Philosophy or Doctor of Philosophy. Applications are invited from students on relevant Master's programmes, but well qual-
ified students can be admitted directly from a first degree; they
may be required to take the MA before proceeding to research
registration.

The Research Centre in Women's Studies is part of the
Graduate Research Centre in Culture & Communication at the
University of Sussex. We offer an MA in Women's Studies
(available both full-time and part-time) as well as offering re-
search supervision for a DPhil in Women's Studies (also avail-
able full-time and part-time).

Women's Studies explores the following:

- The contribution of feminist theory to a range of aca-
demic disciplines.

- The social construction of 'gender' with particular refer-
ence to 'life histories' and women's autobiographies and
to the role and status of women in society.

- Cultural representations of women in different societies.

- The gendered construction of identity in different cul-
tures.
3.18.12 **Department of Innovation Studies, London**

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<th>Name</th>
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<td>Address</td>
<td>University of East London</td>
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<td>Maryland House, Manbey Park Road</td>
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<td>Contact Person</td>
<td>J. C. Sherman</td>
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**Profile**

The Department of Innovation Studies is a multi-disciplinary department which explores, through its teaching and research, the complex relationship between social and technological change. In particular, it aims to promote an understanding of the various factors involved in the development and use of the rapidly evolving new information technologies.

The Department is strongly committed to providing opportunities in higher education for mature students, women and ethnic minorities. It seeks to expand access to our degree programmes to students whose interests cut across the traditional science-arts divide and who wish to develop IT skills in their chosen field of study.
The Department runs a full programme of research, which draws on expertise from a range of disciplines. Its objective is to address the major issues involved in the development and use of key technologies in modern British and European society, and to inform intellectual and policy debates in this area.

The department has 15 tenured staff members.

**Education**

The Department offers a range of undergraduate degrees in areas such as:

- Information Technology
- New Technology and Education
- Women and New Technology
- New Technology, Media and Communications
- New Technology and Multimedia.

Innovation Studies offers both taught and research-based postgraduate degrees at MA, M.Phil and PhD level.
Undergraduate Degrees

The department offers degrees in two subject areas: Technology and Society and Information Technology. Within the Technology and Society area, it offers a wide range of specialist degrees, currently comprising:

- BSc (Hons), New Technology and Education
- BSc (Hons), New Technology, Media and Communication
- BSc (Hons), New Technology and Multimedia
- BSc (Hons), Women and New Technology

The Technology and Society subject area explores the social cultural economic and political influences upon the process of technological change, as well as the effects of such change on society and individuals. The degrees in this area also provide students with the practical computing skills associated with their chosen field of study.

The New Technology specialist degrees have developed into a unique undergraduate programme in which technological change is studied in the context of particular themes and areas of industrial application. For instance, the Women and New Technology degree has developed practical and conceptual skills in relation to the study of gender and technology; the
CHAPTER 3. INSTITUTIONAL INFORMATION

Media and Communications degree focuses on the cultural and social implications of technological change in the media industries and provides practical units and degree pathways in video production and computer graphics; and the Education degree examines technological change in the areas of education and training and enables the student to utilise software in the educational, training and administrative environments.

The Information Technology area offers major, minor and joint degree pathways.

Other courses are also available outside the University’s degree scheme.

Postgraduate Degrees

At postgraduate level, the Department is one of 12 European partners offering an MA in Society, Science and Technology in Europe. Students taking this degree spend half their time at the University of East London and the other half at one of the European partner universities.

We also have a programme of research-based M.Phil and Ph.D. degrees.

MA in Society, Science and Technology in Europe

This is a one-year course which is being run by the Dept. of Innovation Studies in conjunction with 12 other universities in 10
different European countries. In the first semester, each student takes a common curriculum in her/his home country. In the second semester, the student chooses one of a range of specialist options and will be expected to spend the semester in another European country.

The modules of the common curriculum are:

- European Problems of Society, Science and Technology
- The Historical Perspective on Scientific and Technological Change
- Science and Technology in the Making: Entering the World of the Laboratory
- Globalisation and the Regulation of Science and Technology
- The Politics of Knowledge

**Costs and admission criteria**

For home and EU students, the costs are approximately British Pound 2,500, for non-EU students approximately British Pound 5,950.

For the European MA course, funding is available to support student mobility via the European Union’s ERASMUS/SOCRATES programme. The UEL course is recognised
by the Economic and Social Research Council and receives two quota awards to pay fees and maintenance of approximately British Pound 6,700. To be considered for the ESRC awards, applications must be received before the end of April.

International collaboration

The department is member of the ESST network and of the Na­tional Assocation of STS Departments ASSIST.

It cooperates closely with Warwick Business School, the Science Policy Research Unit in Sussex, and the University of Oslo, Norway.

3.18.13 Department of Sociology and Social Policy, Durham

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<td>Steve Fuller</td>
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Profile

A number of diverging research topics are being pursued in the Department of Sociology and Social Policy at Durham University. These include:

- The employment relationship, local labour markets, changing patterns of employment, occupational identity and career changes, and women's work in the Second World War

- French cultural theory, and modern art and cultural theory

- Social epistemology, which most simply put is the normative study of knowledge systems

Education

Among the courses taught at Durham are:

- Historical and Comparative Sociology

- Advanced industrial societies

- Studies in work and employment

- Economy and Society (M.A.)
• Screening Europe - a first year course at university college Stockton, this introduces basic themes in comparative cultural analysis using both text and film to support the lectures and seminars.

• Risk and Surveillance - a third year course on the BA (Hons) Sociology (also available as a postgraduate course on the MA, with a different seminar programme), its major axes are the work of Ulrich Beck and Michel Foucault, with case study seminars (Bhopal, Challenger, AIDS, Gulf War, Madness) and theoretically exploratory lectures.

• sociological theory (undergraduate course)
3.18.14 Centre for the History of Science, Technology and Medicine, London

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**Profile**

The Centre for the History of Science, Technology and Medicine (CHOSTM) is a free-standing Centre within Imperial College. The history of science and technology has been taught and researched at Imperial College since 1963, and since 1994 we also teach and research in the history of medicine.
Education

Our main teaching activity is the MSc in the History of Science, Medicine and Technology run through the London Centre for the History of Science, Medicine and Technology. We also make a major contribution to the teaching of the non-language humanities to undergraduates through the College’s Humanities Programme by offering the following courses to undergraduates at Imperial: Modern European History; Politics; History of Technology; History of Science; History of Medicine.

A new agenda for the public understanding of science

Britain’s first Professor of the Public Understanding of Science, John Durant has outlined a new agenda that he believes will lead to a better comprehension of science by the public. Public attitudes towards science are typified by scepticism and ambivalence, argues Prof. Durant. “Our current agenda for the public understanding of science is dominated by the twin aims of inspiring interest and fostering learning.” “We need to think of science as ‘public knowledge’; as a body of evolving findings whose scope, limits, applications and implications are always open to public scrutiny, public debate and public criticism.” Ideally, Prof. Durant sees public forums as the most effective and democratic way of fostering the dialogue between scientists and non-scientists. He emphasises however, that a great deal of imagination and hard work will be needed to turn the ideal of public participation in science into a practical pro-
gramme. "We should be looking," suggests Durant, "for many
different ways of involving people in the science and technol-
ogy that affects their lives....anything less than this would con-
stitute a wasted opportunity".

For more information, contact Professor John Durant on
0171-594 8839 or email: j.durant@ic.ac.uk

3.18.15 History and Philosophy of Science, Leeds

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<tr>
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<td>S. Darwell</td>
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Profile

Although an integral part of the Philosophy Department, the Di-
vision of History and Philosophy of Science is one of the largest
groups in the country devoted to the subject, with a strong tradi-
tion in both teaching and research. The Division offers courses
that subject science and technology to analysis from historical,
philosophical and social perspectives. Questions such as the
following are addressed: Can scientific theories ever be proved true? What sense can be made of the world revealed by quantum mechanics and relativity theory? Can biology be reduced to physics? What conditions led to the rise of modern science in 17th century Europe? How did Newton frame his theory of universal gravitation? What impact has Darwin’s theory of evolution made on society? Do consumers get the technologies they want? Is science gender neutral?

The Division of History and Philosophy of Science at Leeds comprises eight full and associate members of staff with research and teaching interests covering all significant aspects of the discipline. As a distinct unit within one of the largest Departments of Philosophy in the country, the Division can draw on all the resources of a large department. There is an extensive overlap of teaching and research interests between the Division and the Philosophy 'section', and postgraduate students are invited to attend the parallel series of Senior Seminars and Research Workshops. In addition, a Graduate Workshop meets weekly and students are encouraged to give short presentations on aspects of their current research. There is also a series of seminars covering research skills and training, including topics such as the use of email, bulletin boards and the World Wide Web, library resources, and presenting and submitting papers.

The Head of the Division, Professor Geoffrey Cantor, is a past President of the British Society for the History of Science and the other members are all active in various profes-
sional organisations, such as the British Society for the Philosophy of Science, the Philosophy of Science Association, and the British Society for the History of Science. Recent conferences organised by the Division include 'The Museums Forum' (now a biannual event), 'Many Minds, Many Worlds and Quantum Physics', 'Collingwood' (organised jointly with the Philosophy section) and the Annual Meeting of the British Society for the Philosophy of Science. In 1997 the Annual Meeting of the British Society for the History of Science is to be held in Leeds in conjunction with the Annual Meeting of the British Association for the Advancement of Science.

The Division also offers a relaxed and friendly environment in which to study. Members of staff are readily available for discussion and advice and the offices are arranged around a large central foyer in which both staff and students can meet, discuss, read, eat lunch or just take a break. There is a separate postgraduate room where graduate students can study or prepare classes and all students have full access to University computer facilities, including word processing, email and the World Wide Web.

Education

Since October 1993, degree courses at the University of Leeds have been arranged in a modular system. Divided into three levels, a level being a year's full-time work, a degree is attainable
at the end of level 3. There are three terms, broken by vacations at Christmas and Easter. Teaching is divided between two semesters, each of 11 teaching weeks followed by an assessment period. The first semester finishes at the end of the 2nd week of the second term, and teaching in the second semester finishes at the end of the 4th week of the third term.

Each level is worth 120 credits, 60 credits normally being taken in each semester. Credits taken at level 1 must be passed to proceed to level 2; and the degree result depends on the 240 credits taken at levels 2 and 3. Most modules are worth either 10 or 20 credits, and are assessed by course work and/or examination at the end of the semester(s) in which they are taught.

The modules in HPS cover four main areas:

- **History of Science** - including topics on the history of medicine, the physical sciences, the biological sciences, science and society, and science and religion.

- **Philosophy of Science** - engaging such issues as the nature of scientific progress, the relationship between theory and evidence, philosophical problems of evolutionary biology and modern physics, and ethical questions concerning the impact of science on society.

- **Technology and Society** - investigating the complex ways in which technology affects our lives - through travel, communication, the degradation of the environment, etc.
- and the social, political and economic factors that shape technology.

- Historiography - concerned with the problems of interpreting the past and writing history.

A core course at level 1 consisting of four introductory modules - two on the history of science, one on the philosophy of science and one on technology and society - provides the basis for more advanced modules in the above areas. There is also the possibility of writing a dissertation in the final year. Students from all faculties can take electives in HPS. For details of modules, please see the List of Modules.

There is no single-honours degree in HPS, but it can be taken as joint-honours, major-honours or minor-honours. For the joint-honours courses available with HPS as a component, see Degree Schemes.

Teaching is through a combination of lectures, seminars and tutorials, depending on the module; and the policy of the Division is to encourage as much participation in discussion of issues as possible.

Leeds offers a number of degree schemes with History and Philosophy of Science (History of Scientific Thought in the case of BA degrees) as a named component, leading to both BA and BSc degrees.
3.18.16 London Centre for the History of Science, Medicine and Technology, London

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Profile

The London Centre for the History of Science, Medicine and Technology was formed in 1987. It brings together three leading academic centres of research and teaching in the subject, making it the single largest concentration of expertise in Britain. These centres are the Centre for the History of Science, Technology and Medicine at Imperial College, the Department of Science and Technology Studies at University College London, and the Academic Unit, Wellcome Institute for the History of Medicine/University College London. The London Centre is
also closely linked to the Science Museum.

The main role of the London Centre is to run the MSc programme in the History of Science, Medicine and Technology. This is now the largest taught MSc programme in the country, attracting more than 20 students each year. Over the years many of the leading scholars in the history of science, technology and medicine have begun their training with postgraduate study in London. In addition to the MSc the London Centre organises conferences and other activities.

Facilities

Imperial College of Science, Technology and Medicine and University College London are two of Great Britain’s leading university institutions. Both date back to the nineteenth century. Imperial College is in South Kensington on a site close to the Science Museum, the Natural History Museum, the Victoria and Albert Museum, and the Royal Colleges of Art and Music. University College London is in Bloomsbury, near the British Museum and the British Library, while the Wellcome Institute for the History of Medicine is adjacent to University College London.

The specialist facilities available for the study of the history of science, technology and medicine are unrivalled. The essentially historical library of the Science Museum holds over 600,000 volumes. The Science Museum has one of the world’s
greatest collections of scientific, technical and medical artefacts. University College London has a fine history of science collection, including the Grave collection of early books. The Wellcome Institute for the History of Medicine has a collection of 400,000 printed books and provides a unique resource devoted solely to the history of the biomedical sciences.

The London Centre brings together a large number of teaching staff in the history of science, technology and medicine, making it the largest concentration of specialists in the world. The range of topics covered is vast. Some 12 staff teach on the MSc course in each year, and other staff are also available to students. Students may also attend a wide range of lectures outside the MSc programme.

Students at the London Centre are registered at Imperial and University College, and thus have access to all the facilities of both institutions. In addition students have access to the Wellcome Institute for the History of Medicine, and free entry to the Science Museum.

Postgraduate course

Degrees: MSc, MPhil, PhD or MD

MSc in History of Science, Medicine and Technology

The aim of the MSc course is to provide thorough training for students in the history of science, medicine and technology. The core course provides general introductions, as well as
3.18. UNITED KINGDOM

a very strong methodological and historiographical component. Option courses provide a specialist treatment of particular topics ranging from Philosophy of Science to The Scientific Revolution. All courses are only given to students taking the MSc. All lectures take place during the day.

Some students go on to PhD degrees and also to develop careers in many other related fields, including museums. Students come from a very broad range of backgrounds, ranging from history to engineering. A number of our students have backgrounds in the museum and educational worlds. Most of our students are full-time, but we have a substantial number of part-timers.

The course lasts a full calendar year, and runs between October and September. For part-time students the course takes two full years. The course is very intensive: as well as attending lectures, students are required to do a great deal of reading and to write five short and four long essays, as well as a dissertation. There are also examinations on the Core Course and on the two options studied in the spring and summer terms.

Admissions

Applicants should have a first or good second class Honours degree or equivalent in a relevant subject. Our students come from a wide variety of disciplinary backgrounds but we do look for evidence of a real interest in the history of science, tech-
nology and medicine and/or the philosophy of science. Where possible, we interview all candidates.

Applications should be made as early as possible. Candidates who wish to be considered for awards from the British Academy, the ESRC and Wellcome Trust should apply by 1 March. The final deadline for applications to the British Academy and the ESRC is 1 May. Wellcome Trust studentships are awarded to the most qualified applicants who express explicit interest in the history of medicine. The London Centre staff will nominate candidates for these studentships on the basis of their MSc applications, and no separate applications are required.

The course is recognised by the Humanities Research Board of the British Academy, and by the Economic and Social Research Council (ESRC). In addition, the Wellcome Trust provides studentships for those wishing to specialise in the history of medicine. Students ordinarily resident in Scotland or Northern Ireland should contact the Scottish Education Department, or the Northern Ireland Department of Education. Applicants from outside the United Kingdom should contact the British Council office in their own country for details of grants available.
Going on to a PhD

Some of you will be wanting to go on to do a PhD, in London or elsewhere. It is important that you discuss this possibility with a member of staff within the first two months of the MSc course. Entry to PhD programmes in London requires a very high standard of achievement, and competition for grants from bodies such as the Wellcome Trust and the British Academy is intense. It is very unlikely you will be accepted for PhD work if you are not achieving at least a B+ mark in your essays. In short, in order to go on to a PhD you should be aiming, from the beginning, to achieve a distinction in your MSc.

Admission to PhD programmes in the component units of the London Centre usually requires that students have performed well in an appropriate MSc or MA course. Exceptions may be made for students who have done a great deal of history of science, technology or medicine as part of a first degree. It is now widely recognised that a specialist MA or MSc course is an extremely valuable training for research.
3.18.17 Department of Social Sciences, Loughborough University, Leicestershire

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Profile

The Department of Social Sciences at Loughborough was established in 1972. It is a major interdisciplinary department within the Faculty of Social Sciences and Humanities. It is unique in British Universities in its combination of academic disciplines - sociology, social psychology, and social policy. The department offers undergraduate degrees in each of these disciplines and in communications and media studies. Postgraduate taught courses are offered in Women’s Studies, Criminology, and in Policy Organisation and Change in Professional Care.

The Department of Social Sciences houses three research centres which provide an institutional focus for externally
funded research and for postgraduate research students:

- Centre for Research in Social Policy (CRSP)
- Midlands Centre for Criminology and Criminal Justice
- Communications Research Centre

**Education**

The Department offers postgraduate taught degrees in: Women’s Studies; Criminology and Criminal Justice; Policy, Organisation and Change in Professional Care. The Department offers undergraduate (B.Sc.) degrees in: Sociology, Social Psychology, Social Policy, and Communications and Media Studies.

*Social Psychology at Loughborough University*

*Programme Director: Jonathan Potter*

The most distinctive feature of Loughborough’s Social Psychology degree course is that it is one of the few in Britain to offer students the opportunity to approach psychology from a social rather than the more usual biological or individual perspective.

Approaching psychology from this perspective means that people are studied in relation to each other rather than as self-contained individuals.
To help you gain a more fully rounded, multi-disciplinary education, the Social Psychology degree also offers the study of another social science discipline. This makes up about a third of the total course and is chosen from among Sociology, Social Policy, Communications and Media Studies, Politics, Economics and Computing. Alternatively, in your second and third year you can take additional Social Psychology courses. With this choice of subjects you can tailor the structure of your degree to suit your particular interests and career intentions.

The Social Psychology degree course is recognised by the British Psychological Society (the professional body of British Psychologists) for graduate membership of the Society and for the graduate Basis for Registration.

Psychology or Social Psychology

Having read a number of course brochures, the would-be psychology student may feel confused by the variety of titles given to psychology degrees. What is the difference between Psychology, Social Psychology, Applied Psychology, Education Psychology, Human Psychology and a number of others?

The answer is largely to do with the differing emphases of the courses rather than with how well they qualify you to become a psychologist. If you would prefer to study people through their attitude and relationships, then Social Psychology at Loughborough may well be the best for you. If, however, you want a course with a strong biological emphasis then our Social Psychology degree would probably not be your ideal choice.
Overview of Course Structure

The course lasts for three years. In the first year you will take introductory courses in social and experimental psychology, statistics, sociology and an optional subject. In the second and third years you go on to study substantive areas of psychology, research design and data analysis, and the other subjects of your choice. In your third year you undertake an individual project based on a topic of your own choice.

One important and attractive feature of the course structure is that many of the Social Psychology courses may be taken in either your second or third year, thus providing you with greater flexibility and choice.

3.18.18 Manchester Business School, Manchester

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<tr>
<th>Name</th>
<th>Manchester Business School</th>
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<tr>
<td>Address</td>
<td>Booth Street West</td>
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<td>Email</td>
<td><a href="mailto:www-admin@fs2.mbs.ac.uk">www-admin@fs2.mbs.ac.uk</a></td>
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<tr>
<td>Contact Person</td>
<td>Marketing Department</td>
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Profile

The University of Manchester and UMIST have formed the Manchester Federal School of Business and Management to bring together the Manchester School of Management in UMIST, the Department of Accounting and Finance, the Programme of Policy Research in Engineering, Science and Technology (PREST) and the Manchester Business School in the University of Manchester.

Education

The linked resource base allows greater access to new activities, new students and other clients. For example, a full range of teaching programmes are to be offered including undergraduate courses in management, accounting and finance, and joint courses in combinations such as engineering and science with management, computer science and accounting.

There are postgraduate taught Masters degrees in a range of specialist management and accounting subjects, full-time and part-time MBA's and research degrees at both the Masters and Doctoral levels. Although many of these are offered in the individual institutions, the increased flexibility provided under the new structure enhances the quality and the efficiency with which they are delivered.

The Manchester MBA is an internationally recognised pro-
programme which prepares young men and women of high potential for careers in management. The programme combines lectures, case studies, tutorials and computer simulations with real-life projects aimed at bridging the gap between tools and techniques and their implementation in 'live' situations. The Full-time MBA lasts for 18 months, split into roughly two equal parts. The Diploma stage and the MBA Stage.

Costs and admission criteria

MBA Full Time:
- Type and length of course: 18 months full-time
- Number of places: 130 places
- Entry requirements: Undergraduate degree or equivalent professional qualification, GMAT, IELTS or TOEFL, essay and two references
- Fees: BP 16,000 (EU students), BP 19,000 (Non-EU students)

MBA Part Time:
- Type and length of course: 2.5 years (minimum) - 5 years (maximum) part-time study Tuesday or Thursday evenings, or Friday mornings or afternoons
- Start dates: September, January or April
- Number of places: 50 places
- Entry requirements: Undergraduate degree or equivalent professional qualification, GMAT, essay and two references
Fees: BP 14,940 (BP 830 per module)
MBA Modulair:
Type and length of course: 3 years part-time
Start dates: January
Number of places: 20 - 30 places
Entry requirements: Undergraduate degree or equivalent professional qualification, GMAT, IELTS or TOEFL, essay and two references
Fees: On application

3.18.19 PREST, Manchester

<table>
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<tr>
<th>Name</th>
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Profile

PREST is a centre of study into questions surrounding science and technology policy and strategy. This area of research is one
that is evermore important given the shift toward a 'knowledge-intensive' society in which scientific and technological knowledge play central roles. Unfortunately, much of the discussion and debate about these issues that takes place in the media and elsewhere is rather superficial. We seek to bring to bear the insights and tools of social science to provide a more solid basis for our work. We aim to inform discussion and debate, provide analysis and advice to policymakers and opinion formers, and provide training for students and practitioners.

PREST's research can conveniently be grouped into four broad areas:

- Innovation Studies
- Research Evaluation
- Science and Technology Policy
- Prospective Research.

In practice, there is often considerable overlap between the four lines of work, and there are also often cross-cutting themes. Examples of these cross-cutting themes are studies of environmental issues and "clean" technology, and studies of Information Technology and Advanced Telecommunications. Both of these cases have received attention under the headings of innovation studies and evaluation research - and, to a lesser, extent, under the other two headlines as well.
CHAPTER 3. INSTITUTIONAL INFORMATION

INNOVATION

PREST is at the forefront of theoretical and empirical studies of technological innovation. (We understand this to encompass invention, new product development and marketing, diffusion, and implementation and application of technologically transformed goods and services.) Professor Stan Metcalfe is one of the major figures in the development of evolutionary theories of economics and technological change. A 15 year programme of research, built upon successive Research Council grants, has developed a distinctive perspective in most of our work, founded in the new evolutionary economics. This perspective stresses the dynamic aspects of technical change, and the interplay between technological development and user requirements which takes place in the context of a competitive environment. Professor Peter Swann has made important contributions to these studies. A recent stream of work extends innovation research to the service sector, where we are paying attention to services as producers as well as users of innovation. The national context is examined through studies of innovation systems and policies. We also have devoted numerous studies to generic technologies -especially new Information technology- and to the impact of environmental challenges on the innovation process.

RESEARCH EVALUATION

Policy makers need an informed basis on which they can make decisions about the allocation of R&D resources be-
between competing areas, and can ascertain the value for money
achieved from their decisions. Evaluation is also a learning
process for the conduct of research and innovation: questions
of the organisation and management of R&D are very much
to the fore. Evaluation of government and European Union -
sponsored R&D has been a cornerstone of PREST's activities
for a decade, and Professor Luke Georghiou is internationally
recognised as a leading expert in the field. Our work in this
area includes not only the execution of evaluations, but also the
development of methodology to be used in this process, and
the design of evaluation and assessment systems which can be
used by policymakers and funding agencies. PREST's inter­
national standing in this area of research is underscored by the
wide range of organisations for whom projects have been un­
dertaken, some examples of which are shown below. Though
much of this work is of an applied nature, it is often possible
for us to link it to more conventional scholarly concerns, as a
stream of articles in journals like Research Evaluation testify.

SCIENCE AND TECHNOLOGY POLICY

Analysis and assessment of the impact and effectiveness
of national and international science and technology policy is
a continuing theme at PREST. Professor Phil Gummett is a
leading contributor to the analysis of UK science and technol­
ogy policy, as well as contributing significantly to the study
of military and dual-use technological decision-making. Re­
search covers a wide spectrum of activity which links longer-
term projects aimed at furthering understanding, with shorter-
term investigations responding to the needs of clients. Recent
work in this area includes examinations of national science pol-
cy policy systems, studies of scientific capital and labour, and work
on indicators.

PROSPECTIVES

PREST has long been a centre for studies which take a
prospective view on the development of science and technol-
gy. Professor Ian Miles is a consulting editor for Futures, the
leading journal in the field. These studies aim to provide infor-
mation about factors affecting the nature and scope of particu-
lar areas of development, and are thus intended to be of use in
the management of R&D and at the policy level. Often the re-
sults are of more general interest, as is particularly apparent in
the case of the studies we performed for the Office of Science
and Technology’s Technology Foresight programme. PREST
was largely responsible for a series of quantitative studies here,
including a very large-scale suite of Delphi surveys of numer-
ous areas of technological development. As this study exempli-
fies, our research in this domain includes methodological and
applied projects, including both those with a broad scope and
those applied to particular areas of technology.

PREST hosts 23 researchers.
Education

The University of Manchester offers inter-disciplinary training in the field of science and technology policy studies. It does this within the framework of a strong research school based in PREST (Policy Research in Engineering, Science and Technology) and by drawing upon members of the School of Economics and the Department of Government.

**M.Sc. IN TECHNICAL CHANGE AND INDUSTRIAL STRATEGY**

The course addresses issues of fundamental importance to countries today: how does science and technology interact with industry, society and government, and how can it be managed for economic and societal goals? Through engaging with historical, economic, social and policy analysis, the MSc course provides an excellent perspective upon the mechanisms and choices available to institutions, firms and governments in the management of science and technology.

The MSc is a full time course over 12 months (arrangements for part-time study can be made). In the first semester students complete eight compulsory taught modules, and in the second follow two compulsory and four optional modules. The remaining six month period is spent on the research project and dissertation.

**Teaching methods**

Class sizes are typically small and exclusively post-
graduate and the style is interactive, with emphasis on student presentations, group work and discussions, case study analysis and problem-solving. Modules are assessed mainly by essay or written project, some by presentation as well. At the end of the taught period is a written examination. Students must pass both the taught modules and the examination to proceed to the dissertation, achieving a mark of at least 50.

Assessment involves three distinct stages:

- A piece of work is submitted for every module, and is assessed. This is usually an essay, but in some cases is a presentation based on a short project (sometimes done in small groups).

- An examination is taken at the end of the taught part of the programme. Marks obtained from coursework and examination determine whether a student proceeds to prepare a dissertation for an MSc, or, exceptionally, a shorter piece of work for a Diploma.

- A dissertation (or shorter piece of work in the case of the Diploma) is submitted at the end of the second half of the programme, and is examined by two examiners, one inside PREST, the other external to the University. PREST can draw upon a wide range of supervisory competence.

The PREST Doctoral Programme
PREST supports a very diverse range of PhD research projects, reflecting the broad range of research interests of our staff.

If our interests are broad, so are the backgrounds of our PhD researchers. People come to us from all around the world: at the moment PREST PhD researchers are drawn from over ten nations, including Latin American and South East Asian students as well as those of UK and European origin.

PREST offers a unique research training environment - it really is at the heart of the action. On its own, PREST is one of Europe’s leading science and technology policy institute’s. We are also situated in the UK’s largest non-collegiate university, with alliances to two of Europe’s leading management schools, the Manchester School of Management at UMIST and Manchester Business School. All this takes place in Manchester, Europe’s biggest and arguably most dynamic university city.

With such a large range of interests, experience and orientations under our roof we are always willing to discuss proposals for new PhD projects. We are always looking for new high calibre PhD researchers.

Costs and admission criteria

M.Sc. IN TECHNICAL CHANGE AND INDUSTRIAL STRATEGY

Candidates have a wide variety of backgrounds: natural sci-
ences, engineering, economics, or social sciences. They must have reached a standard of a 2(ii), or have equivalent experience. To be eligible for an ESRC Studentship, a first class or 2(i) is required.

Students whose native language is not English are expected to pass the IELTS test at Grade 6 or above or obtain a TOEFL with a minimum score of 550. They will then be expected to join a course taught by the University of Manchester English Language Teaching Unit during the summer before beginning the first postgraduate semester.

It is vital that you think about how you will fund your studies at the same time as you apply for admission to a programme of study. You will have two major expenses to cover during your period of study:

- Tuition Fees

This covers the cost of your study at the University. Payment of the fee is due at the time of registration, and, if your study is being funded by a Research Council, government or other institution, you should produce evidence that the awarding body will guarantee the payment. Full-time self-financing students may pay by instalment, for which a small credit charge will be imposed. Again, you will have to produce evidence from a bank or similar institution to show that you have enough money to cover the cost of your study. If you wish you may pay by credit
card, for which a small additional cost is payable.

The 1997/98 fees for full-time graduate programmes are as follows*:

- UK Students: BP 2,540
- European Union (EU) Students: BP 2,540
- Overseas Students in PREST: BP 6,350

- Living Costs

You will need enough money to cover your living costs for the duration of your study. This will include the cost of accommodation, food, travel, clothing, entertainment, essential books and other materials. Manchester benefits from having a lower cost of living than cities in the south of the UK.

As a general rule, a single full-time student will require an annual amount for living expenses of about BP 5,900 a year (1994 figures). You should assume that this figure will increase annually in line with the UK rate of inflation. If you have dependents with you, you will need to allow a similar amount for each person accompanying you. These figures are estimates only, and will depend on your lifestyle and your type of accommodation.
CHAPTER 3. INSTITUTIONAL INFORMATION

International

Internationally, we participate in an ERASMUS European student exchange network. In appropriate cases, this provides an opportunity for European students to take courses or conduct fieldwork in another country. With these collaborating partners we also run short intensive courses for postgraduates on subjects of interest to particular centres.

PREST’s courses are also delivered directly to audiences abroad. We regularly organise a 5 day British Council International Seminar on Science and Technology Policy. Through the European Institute of Technology we have joined a European network offering postgraduate courses in technology management. Individual staff members regularly give visiting lectures in a number of European countries.
### 3.18.20 Science and Technology Studies Unit, Cambridge

<table>
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<tr>
<th>Name</th>
<th>Science and Technology Studies Unit SATSU</th>
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<tbody>
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<td></td>
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<td>WWW address</td>
<td><a href="http://www.anglia.ac.uk/hae/satsu/">www.anglia.ac.uk/hae/satsu/</a></td>
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<tr>
<td>Contact Person</td>
<td>Andrew Webster</td>
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**Profile**

The Unit was established in 1988 and conducts research in three broad areas: the sociological analysis of science and technology policy especially in relation to the knowledge and research interface between public and private sectors, the cultural dynamics of technological change especially concerning technology acquisition, and women and reproductive technologies in the health sector.

The Unit has won external funding from the ESRC, the EC, NATO and other external agencies (such as the British Council) to work on projects in all three areas, which have included some of the first detailed analyses of the sociological dynamics of
the commercialisation of the public sector science base and its relation to the wider innovation system.

The Unit leads a research network in the Cambridge/North London region among sociologists and other social scientists with similar interests. This has led to a programme of research seminars and day-long Workshops such as that on 'Risk and the Environment' and 'Sociology and Science Policy, 'Social and Technological Innovation in Cambridge', 'Reconstructing the NHS: Which technology, Whose voices?', 'Race and Technology' and others. Workshops will run three times a year.

The Unit has conducted a number of consultancies for both public and private sector clients, including reports for the ESRC and Office of Science and Technology. Members of the Unit are regular presenters at research conferences in universities in the UK, Europe, the USA and Latin America.

The centre has 13 researchers.

**International collaboration**

The predominant goal of the Unit is the creation, implementation, and evaluation of major research projects within the sociological study of science and technology. One key aspect of this is collaboration with other researchers in the UK and abroad, particularly in Europe.

The emphasis on international collaboration has led to several links being made:
• Dr Andrew Webster is on the Scientific Committee of the Rosselli Foundation in Milan and a member of the European Science Foundation’s Science and Technology Policy Group.

• The Unit is founder member of the recently established AsSIST (the Association for the Study of Innovation Science and Technology) that acts as a national research and training network in the sociology of science. As a result of AsSIST’s lobbying, HEFCE has appointed a sociologist to the UoA Sociology Panel who has a strong track record of research in the sociology of science and technology.

• SATSU co-ordinates three international programmes, TERAIN (EC-funded) which brings together researchers from west and east Europe, an international study Group on technology transfer and innovation systems, and an Anglo-Brazilian programme examining the commercialisation of Universities and the development of biotechnology policies in Brazil.
3.18.21 Science Studies, Edinburgh

<table>
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<tr>
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<th>Science Studies Unit University of Edinburgh</th>
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<tbody>
<tr>
<td>Address</td>
<td>21 Buccleuch Place, Edinburgh EHS 9LN, SCOTLAND UK</td>
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<tr>
<td>Contact Person</td>
<td>Carole Tansley</td>
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Profile

The Science Studies Unit was formed in 1966 to develop a programme of teaching and research on social aspects of science. It is an interdisciplinary group, combining expertise in philosophy, history and sociology, mostly though not exclusively within a sociology of scientific knowledge perspective. It was originally a separate department based in Science Faculty, but is now located within the Department of Sociology in the Social Sciences Faculty. In 1987 it was designated by the UGC as one of four major UK Centres of Excellence in its field.

Current Postgraduate research areas include:

- the history of mathematics
3.18. UNITED KINGDOM

- complementary medicine and general practitioners
- medical provision for women in Edinburgh, 1870-1930
- the sociological history of transaction costs
- feminism and animal rights
- social history of 18th-/19th-century geology
- social construction of sex and gender
- marginalised knowledge in social science and in caring for the dying and bereaved

Education

**Degrees:** MSc in Science and Technology Studies, PhD.

There are at present four members of academic staff. The main undergraduate teaching is provided for science, engineering and medical students, and serves to introduce them to the historical development of scientific knowledge and the characteristics of science as a social institution. Unit staff also contribute heavily to postgraduate teaching on the MSc in Science and Technology Studies, and on philosophy of social sciences for the research training offered by the Graduate School in Social Sciences.
The Science Studies Unit provides an opportunity for students to undertake in-depth research on various aspects of the history, philosophy and sociology of science and medicine - providing a match can be found between students' interests with those of the Unit staff for purposes of supervision.

Some graduate students have been co-supervised with other departments, e.g. working on topics in technology studies. Others have engaged on research into historical topics, including aspects of the history of medicine and psychiatry, scientific naturalism and ideas of causation, problems of botanical classification, and the development of plant ecology. PhDs have also been completed on the development of high-energy physics and modern astronomy, controversies in modern biology, feminist epistemologies of science, and holistic biology and philosophy. Current doctoral projects include the history of psychology, geology, and obstetrics, animal rights, the sociology of economics, and gender and the Internet.

The teaching and supervision available in science studies at Edinburgh brings students into contact with an established research community with a strong record of internationally recognised research in the field. Doctoral students in the Unit join a lively postgraduate community. They have the possibility of interacting with other researchers in the STS@ED network, which includes various groups working in the closely allied field of technology studies. Where appropriate, students are encouraged to take advantage of the outstanding expertise at Ed-
inburgh in Computer Science, Artificial Intelligence and other science, engineering and medical departments.

In addition to The Universities’ main library, there is a small specialist library in the Science Studies Unit. The Unit runs regular seminars in which students are encouraged to participate; departmental and Faculty seminars are sometimes relevant also. Together, this represents a very stimulating and supportive milieu in which to pursue doctoral research on science studies.

Costs and admission criteria

Entry is in October of each academic year, for both full time and part-time students. There are two possible courses of action.

- Year 1 - Study for and attainment of an MSc by Research in Science Studies (includes required coursework). Year 2,3,4 - Research and writing up PhD topic.

- Year 1 - Completion of required coursework (without the award of MSc qualification). Year 2-3 - Research and writing up PhD topic.

In both cases students must complete required coursework, but the first option allows students an often vital extra year in which to complete their PhD research.
Applicants should normally have suitable qualifications for doctoral study (in the UK system: a 2.1 at first degree level or a relevant Masters degree), as well as a clear interest in the field.

Fee levels are set from year to year. As an indication, the postgraduate fees in 1997/98 were BP 2,540 for UK and EU students, and BP 6,550 for overseas students; part time fees for UK and EU students were BP 1,270. The normal cost of living in Edinburgh as a student is about BP 5,000 a year.

The Unit has one quota ESRC studentship for the MSc by Research in Science Studies. A candidate will be selected competitively from all applicants, and nominated by the Unit for receipt of this studentship. We cannot offer any PhD studentships; we can, however, support bids to grant-giving bodies for specific awards. The Department of Sociology (including the Science Studies Unit) is recognised by the ESRC for receipt of research studentships. These are available for UK students on a highly competitive basis. EU students may apply for fees only awards. (Further details on ESRC funding, and how to get an application form, may be found on the worldwide web here)
**3.18.22 SPRU - Science and Technology Policy Research, Brighton**

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<tr>
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**Profile**

SPRU is one of the world’s leading research institutes in the areas of policy for, and management of, science, technology and innovation (STI).

Our objectives are:

- to undertake multidisciplinary academic research of the highest standard in STI developments and their impact on society

- to generate new empirical data, methods, concepts and theories which explain the place of STI in the global economy
• to deliver world-class postgraduate training which provides students with the analytical and practical skills needed

• to understand and respond to the STI challenges of the future

• to advise government policy makers in the UK and internationally on the economic, social and political challenges presented by developments in science and technology

• to work with firms to develop the tools and techniques needed to manage STI for competitiveness.

SPRU has a team of 40 researchers from a variety of disciplinary and professional backgrounds in the social and natural sciences and engineering. We are a non-profit organisation funded by grants from research councils and foundations; contracts from government, business and international bodies; and teaching. We value the independence and impartiality which this varied funding allows.

The SPRU research library is a key international resource in the field of STI research. The continually expanding collection covers the economics of technical change, technology and innovation management, science and technology indicators, research evaluation, technology in developing countries, energy
policy, information and communication technology policy, national science and technology policies, environmental and social implications of technical change, and chemical and nuclear arms control.

Research is organised around broad themes which often cut across sectors and geographical boundaries.

- **Technology and Innovation in Industry and Firms**
  - The strategy, structure and dynamics of innovating firms
  - Innovation in complex product systems
  - Technological change in the defence industries
  - Research and innovation in biotechnology
  - Innovation in the built environment

- **Science, Technology and Development**
  - The realignment of research systems
  - Technology and innovation in transition economies
  - Technological dynamics of Asian industrialisation
  - Technology and social cohesion
  - Information technology for development

- **Energy and Environmental Policies**
CHAPTER 3. INSTITUTIONAL INFORMATION

- Technology and liberalisation
- Energy markets and regulation
- Towards energy sustainability
- New approaches in environmental policy
- Environmental and consumer protection: analysing the policy process

- Technology Governance and Regulation

- Technology controls on non-proliferation regimes
- Information and communication technology policy
- Politics and economics of the information society

Two new SPRU centres provide a focus for future research.

Education

Degrees: MSc, MPhil, DPhil

SPRU has an international reputation for excellence in its teaching and research, and received a grade '5' in the UK 1996 national research assessment exercise. The teaching programmes are recognised by the UK Economic and Social Research Council and in 1996 the taught MSc/MPhil programmes were awarded Research Training status on the basis of the strong training element encompassing social science research
methods, practical tools for managers, and transferable skills that can be applied in students’ future careers.

Classes are small, and the overall ratio of research students to research staff is around 2.5. Students are taught and supervised by staff actively engaged in science and technology policy research in the United Kingdom, elsewhere in Europe, and internationally. Research is responsive to short and long-term policy and strategic management issues. Our staff act as consultants for governments, businesses and international organisations such as the European Commission, the Organisation for Economic Cooperation and Development, the World Bank, and agencies of the United Nations. SPRU research students are encouraged to publish in collaboration with SPRU researchers and on their own.

Each year approximately 50 students register on the SPRU MSc programmes and between fifteen and twenty students join the DPhil research programme. At any one time about 100 students are in residence in SPRU. Students come to SPRU with strong first degrees in the sciences and engineering as well as the social sciences. There are no restrictions on the subject matter of an applicant’s first degree. What we look for in our students is not a specific form of prior training, but a demonstrated ability for intellectual work.
CHAPTER 3. INSTITUTIONAL INFORMATION

Costs and admission criteria

Details of fees and finance are available in the University of Sussex Postgraduate Prospectus.

As a guideline only, 1997-98 fees for MSc degrees were British Pound 2,540 (full-time home and EU students), 6,425 (full-time overseas-non-EU). MPhil/DPhil yearly fee was 2,540 (full-time home and EU students), 6,425 (full-time overseas-non-EU).

A number of ESRC quota scholarships are available for UK and other EU students for the MSc programmes.

MSc in Science and Technology Policy, for those interested in scientific and technological change, its impact on economic growth and policies for its effective management. (One-year full-time) Applicants should possess at least a second class honours degree or equivalent qualification. Students from countries where English is not the language of instruction are expected to attain a level of English comprehension equivalent to an overall IELTS score of 7.0 or equivalent.

MSc in Technology and Innovation Management, for those interested in strategy and management in innovating organisations in both the public and private sectors. (One-year full-time) Applicants should possess at least a second-class honours degree or equivalent qualification. Students from countries where English is not the language of instruction are expected to attain a level of English comprehension equivalent to an overall
IELTS score of 7.0 or equivalent.

**International collaboration**

We participate in a number of international organizations, amongst which:

- EC DG XII, including the Institute for Prospective Technological Studies, Seville
- EC High Level Expert Group on Social Aspects of the Information Society
- EPSRC Innovative Manufacturing Initiative
- UK Department of Trade and Industry
- UK Office of Science and Technology
- UK Technology Foresight Programme
- House of Commons and House of Lords Select Committees
- United Nations agencies, for example, the UN Commission on Science and Technology for Development eg Working Group on IT and Development
- International Energy Agency
• European Parliament STOA programme

• OECD.

We collaborate especially with:

• Centre for Research in Innovation Management (CENTRIM), University of Brighton

• Maastricht Economic Research Institute on Innovation and Technology (MERIT)

• International Institute for Applied Systems Analysis (IIASA) Laxenburg, Austria

New centres

Three new centres provide a focus for future research:

• Complex Product Systems Innovation Centre (CoPS): Most of our knowledge of innovation derives from mass-produced standardised products. By contrast, the CoPS Centre aims to make a fundamental contribution to our knowledge of high-value, complex industrial products and systems. The Centre was established in October 1996 with core funding from the UK Economic and Social Research Council. It is a joint venture between SPRU and the Centre for Research in Innovation Management (page
3.18. **UNITED KINGDOM**

321) at the University of Brighton, and involves extensive industrial collaboration.

- Chair in Innovative Manufacturing (IMI): This Research Chair and the associated research group aims to improve performance in the construction sector and in other project-based industries. The work programme is based upon partnerships between some of the UK’s top construction companies, their supplier firms and leading academics. The Chair was established at SPRU in 1996 by the Innovative Manufacturing Initiative and the Royal Academy of Engineering.

- Information, Networks and Knowledge (INK): INK is analysing the roles that information and communication technology systems and knowledge institutions are playing in restructuring social, economic and cultural life. By combining research based on the experience of industrialised and developing countries, INK aims to advance theories and practical responses to the issues facing societies engaged in innovative knowledge-based development, and to contribute to improved policies and business practices for social and economic benefit.
CHAPTER 3. INSTITUTIONAL INFORMATION

Communication

Academic audiences are reached by the traditional means of publication and conference presentations. Decision makers in government, industry and international organisations are reached through publications and reports resulting from commissioned studies.

Members of SPRU routinely disseminate their findings through the press.

3.18.23 Science Policy Support Group, London

<table>
<thead>
<tr>
<th>Name</th>
<th>Science Policy Support Group (SPSG)</th>
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<tbody>
<tr>
<td>Address</td>
<td>25 Southampton Buildings</td>
</tr>
<tr>
<td></td>
<td>London WC2A 1AW, UK</td>
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<tr>
<td>Phone</td>
<td>+44 171 242 3775</td>
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<tr>
<td>Fax</td>
<td>+44 171 242 3778</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:Peter.Healey@spsg.org">Peter.Healey@spsg.org</a></td>
</tr>
<tr>
<td>WWW address</td>
<td><a href="http://www.spsg.org">http://www.spsg.org</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Peter Healey</td>
</tr>
</tbody>
</table>

Profile

The Science Policy Support Group (SPSG) was set up in 1986 on the initiative of the ESRC. It is now a non-profit company, registered as a charity, whose aims are to promote the application of science, technology and innovation studies to policy,
practice and management in Europe. SPSG works as a virtual organisation, managing research programmes and networks of academics in a range of institutions. Its current programmes are:

- **The Public Understanding of Science (1998 - 1999).**
  Coordination (with Dr Alan Irwin of Brunel University) of an ESRC New Opportunities Programme whose aims are to: review and re-state the definition of the topic and to collate, analyse and report on the current state of social science based knowledge; improve the flow of findings and ideas from research to policy and practice, and also between users, potential users and beneficiaries (on the one hand) and researchers; to consider and report on the future research agenda, taking account of the views of users and beneficiaries as well as those of social scientists

- **Science City (1997 - ).**
  A public understanding of science website which uses the metaphor of the city to show information, issues and institutions involved in UK science, engineering and technology. Initially sponsored by EPSRC, BT, GPT and Middlesex and Huddersfield Universities.

- **The CREDIT Network (1991 - ).**
CHAPTER 3. INSTITUTIONAL INFORMATION

Directed by Professor Philip Gummett, University of Manchester. A ten country European network on issues of defence technology management, dual use and conversion sponsored by the European Commission between 1998 -2000 to work as a thematic network METDAC under the TSER programme.

An ESRC research programme directed by Peter Healey. The programme has concentrated on four themes whose results are now being reported: European Regulation and the Science Base, Human Resources/Labour Market issues in European S&T, The Evaluation of Collaboration and Networking in European S&T, and Managing Knowledge Flows for Innovation in Europe.

• The PARIS Programme (1997 -).
PARIS - a new programme directed by Professor Harry Rothman of the University of West England at Bristol - stands for Policy Analysis and Resource Indicators in Strategy for Science, Engineering, Technology and Innovation. Professor Rothman and Mr Healey are working with colleagues from SRI International on work funded by the US National Science Foundation on the evaluation of strategic capacity in national research systems. They
are hoping to do wider work on this topic in Europe, Asia and North America with a world team of analysts put together in cooperation with SRI.

### 3.18.24 Department of Science & Technology Studies, UCL, London

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<tr>
<td></td>
<td>University College London</td>
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<tr>
<td>Address</td>
<td>Gower Street, London</td>
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<td>WC1E 6BT, United Kingdom</td>
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<tr>
<td>Contact Person</td>
<td>Brian Balmer</td>
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</table>

**Profile**

The Department of Science & Technology Studies at UCL has an international reputation for research on historical, philosophical and social issues in science and technology. We have seven full-time staff (as well as numerous affiliated experts), including well-known specialists in the history and philosophy of biology and physics, scientific creativity, interplay between art
and science, science policy, science in the modern world, and the communication, ethics and public understanding of science. We also pride ourselves on offering a friendly, supportive working environment as well as recognised excellence in teaching. In STS@UCL, we promote learning on many levels.

**Undergraduate education**

STS@UCL was the first UK university to offer undergraduate degrees in this interdisciplinary subject. Science & Technology Studies (STS) includes the study of history, philosophy, sociology, policy, and communication of science. This is not a general science degree, but a degree programme to study what scientists do as well as their role in our society and in the history of our culture.

Three degrees can be obtained in three three-year programs. The first year aims at giving all students a solid foundation in the historical, philosophical and social dimensions of science and technology. Consequently, students in all three degree programmes follow a common first year, designed to provide a solid foundation in the historical, philosophical and social dimensions of science. In the second and third years the degree streams become specialised. All third-year students in our degree programmes pursue a dissertation project of their own design. These offer opportunities to break new scholarly ground while synthesising content and displaying skills devel-
oped through course work. The excitement and rewards of such original projects provide a fine capstone to our degree programmes. In the past, some dissertations have led to scholarly publications.

- BSc in History and Philosophy of Science

Students enrolled in this degree programme will have an interest in issues concerning the history of scientific ideas, the nature of scientific discovery, concepts of scientific progress, foundational issues in science, and methodological issues in the practices of history and philosophy.

This degree programme consists of a number of separate courses. Every course includes lectures and assessment exercises (normally written essays and an examination). Single courses carry a "course unit value" of one-half, except for the third-year dissertation course which carries a course unit value of one. Under this system, students normally take courses totalling four course units during each of their three years, making a total of 12 course units for their degree. Students take at least nine course units within the department over three years. The three other units are chosen from among the rich variety of course options offered by other arts and science departments at UCL.
• BSc in History, Philosophy and Social Studies of Science

Students enrolled in this degree programme will want to combine some of the best features of both the history and philosophy of science programme and the science communication and policy programme. The goal will be to obtain a broad appreciation of the full range of work within science and technology studies.

This degree programme consists of a number of separate courses. Every course includes lectures and assessment exercises (normally written essays and an examination). Single courses carry a "course unit value" of one-half, except for the third-year dissertation course which carries a course unit value of one. Under this system, students normally take courses totalling four course units during each of their three years, making a total of 12 course units for their degree. Students take at least nine course units within the department over three years. The three other units are chosen from among the rich variety of course options offered by other arts and science departments at UCL.

• BSc in Science Communication and Policy

This degree is for students who wish to specialise in science policy studies and communication of science and who seek close supervision by our Science Communi-
tion Unit. It addresses problems of funding and promotion of science, regulation and control of research, and democratic debate about science and technology. These are approached from the position of a historically and philosophically informed understanding of the contemporary research system and its interchange with society.

This degree programme consists of a number of separate courses. Every course includes lectures and assessment exercises (normally written essays and an examination). Single courses carry a "course unit value" of one-half, except for the third-year dissertation course which carries a course unit value of one. Under this system, students normally take courses totalling four course units during each of their three years, making a total of 12 course units for their degree. Students take at least nine course units within the department over three years. The three other units are chosen from among the rich variety of course options offered by other arts and science departments at UCL.

- BSc in History and Philosophy of Physics
  This is a new degree stream in STS@UCL, first available for admission in the 1998/99 academic year. This degree programme (jointly offered with the Department of Physics and Astronomy) combines courses in science
and technology studies with those in physics. It offers specialised studies for students wishing to engage sophisticated historical, philosophical, and research questions about modern physics. This degree is designed specifically for students with a strong interest in exploring conceptual aspects of the history and philosophy of modern physics. Students apply through the Department of Science and Technology Studies for this degree programme. Applicants should note that there are additional entry requirements.

**Entry requirements for the BSc programs**

- applicants for the History and Philosophy of Physics programme: 3 A-levels, to include physics and mathematics

- applicants for three other degree programmes: 3 A-levels, or 2 A-levels and 2 AS-levels, or Student with A-levels in arts subjects should have GCSEs in at least 2 sciences, or equivalent foreign or international grades.

Students wishing to transfer from other universities or other UCL departments are considered on an individual basis.
Postgraduate programs

The MPhil and PhD are research degrees, suitable for those with sufficient academic background and research interests compatible with those of the staff. Research degrees are offered for study in the history of science, the philosophy of science, the public understanding of science, science policy research, or a suitable combination of those fields.

The MPhil programme provides an opportunity to undertake supervised research for a period of not less than two academic years on a selected topic. Near the beginning of the course, a brief outline of the research must be provided by the student for assessment and approval. A dissertation of moderate length (limited to 75,000 words exclusive of bibliography) is submitted at the end of the research. The dissertation must exhibit either original work, or an orderly, critical exposition of the existing literature. Candidates are examined orally on their dissertations.

All research students are initially registered for an MPhil. On satisfying their supervisor of sufficient progress, they may be transferred to the PhD programme. The doctoral candidate is expected to engage in high-quality original research, resulting in a dissertation of not more than 100,000 words. The minimum period of full-time registration is two calendar years, although in practice few candidates are ready to submit a dissertation in less than three years.
CHAPTER 3. INSTITUTIONAL INFORMATION

The MSc degree in History of Science, Medicine and Technology is offered jointly with Imperial College, and the Wellcome Institute for the History of Medicine. The MSc is a taught programme, designed to introduce students to basic historical and philosophical methods, the important specialist literature, and above all the broad themes which underlie the histories of science, medicine, and technology. Students come from a wide variety of backgrounds, ranging from theology to engineering; a significant number go on to do PhD degrees, and others go into careers in many other areas including museum work. The programme lasts one calendar year (October to September) for full-time students, and two years for part-time students.

3.18.25 Manchester School of Management, Manchester

<table>
<thead>
<tr>
<th>Name</th>
<th>Manchester School of Management</th>
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<tbody>
<tr>
<td>Address</td>
<td>U.M.I.S.T.</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 88, Manchester</td>
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<tr>
<td></td>
<td>M60 1QD, UK</td>
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<tr>
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<tr>
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<td>0161-200-3505</td>
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<tr>
<td>Email</td>
<td><a href="mailto:MSMPG-ENQ@UMIST.AC.UK">MSMPG-ENQ@UMIST.AC.UK</a></td>
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<tr>
<td>WWW address</td>
<td><a href="http://www.umist.ac.uk">http://www.umist.ac.uk</a></td>
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<td>Contact Person</td>
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</table>
Profile

The Manchester School of Management now operates in association with the University of Manchester's Faculty of Economic and Social Studies and the Manchester Business School within the Manchester Federal School of Business and Management.

With over 600 undergraduate, nearly 300 postgraduate, and nearly 70 academic staff, the School is the largest department in UMIST and one of Europe's largest university management schools. The School offers 8 one-year MSc programmes. Graduation from one of these programmes allows direct entry to the second year on the PhD programme.

One measure of the School's research orientation and stature is the scale of its income from external bodies, which presently totals around £2 million annually. A second indication is that in its first ever assessment of university research in 1986, the University Grants Committee (UGC) rated the School's research as outstanding by international standards. Its position as a leading research school was again acknowledged in the UGC's second and third reviews in 1989 and 1992, when it was again one of the four most highly rated UK management / business schools. In the most recent (1996) HEFC Research Assessment, MSM and London Business School were the only ones out of 105 institutions to achieve the maximum 5* rating, which means research is of international standing in most areas.
CHAPTER 3. INSTITUTIONAL INFORMATION

The School is organised into six subject areas, headed by at least one Professor: Economics, Finance / Accounting, Marketing, Operations and Technology Management, Organisation and Employment Studies, and Psychology. The School has three computer officers, a technician, library staff, a central administrative section of nine staff and over 20 secretarial staff. To support its research activities the School employs around 40 research staff and Teaching Company Associates.

Education: Technology Management

This programme examines how the introduction of new technologies into businesses can be facilitated, by examining cases of the business management of technology and by reviewing what management science has to say about the role of technological innovation in business development.

This is a one-year programme taught by lecturers associated with the School’s Centre for Research on Organisations, Management and Technical Change (CROMTEC).

The programme is suitable for graduates in the following categories:

- those already in employment in industry who are concerned with strategic issues in the management of technology.
• recent science or engineering graduates looking for a postgraduate course in management which builds on their backgrounds;

• recent management graduates wanting to specialise in preparation for further postgraduate study;

• teachers in the further/higher education sector who are seeking to enhance their knowledge in the management of technology and/or economic issues in technological change.

After successfully passing written examinations in April, students carry out a research project on a technology management topic; this is submitted as a dissertation for the award of the degree. There are two alternative routes for the research project for the dissertation:

- Company Project - a short project on a topic proposed by a company; research for the project may include a short placement with the company concerned; the project is written as a 20,000 word dissertation.

- Traditional - a short project on any relevant topic leading to a 20,000 word dissertation. The project is supervised by any of the teaching staff in the School. The project involves a literature review followed by some original
investigation of primary or secondary material. A wide range of topics is available.

**Costs and admission criteria**

Many Students are self-financing through Career Development Loans, whilst others have secured a grant from either their employer, or finance themselves from part-time jobs, personal investments or a research funding body interested in sponsoring the research. Occasionally, members of staff within the School will have research grants to recruit PhD students. In addition, since the School's Doctoral Programme has Mode A ESRC recognition, applicants wishing to apply are also eligible to seek ESRC PhD Studentship awards. The School has details of the scheme. Applications in Accountancy can also obtain scholarships from the Institute of Chartered Accountants in England and Wales. The School and the Graduate School also offer a small number of fees-only Bursaries. Ask your supervisor about School Bursaries and contact UMIST's Central Graduate School about the institutional bursaries.

Many overseas students are self-financed from their own sources of income or their families. Others obtain help from their employer, their Government or from the British Council in their home country in some instances. A limited number of Overseas Student Awards are administered by the Committee of Vice Chancellors and Principals. The awards cover only the
difference between home and overseas fees and include no living expenses.

3.18.26 Science, Society and the Media, Bristol

| Name           | Science, Society and the Media  
|                | Faculty of Applied Sciences  
| Address        | University of the West of England  
|                | Frenchay Campus, Coldharbour Lane  
|                | Bristol BS16 1QY, UK  
| Phone          | +44 (0)117 9656261 Ex: 2839  
| Fax            |  
| Email          | Frank.Burnet@uwe.ac.uk  
| WWW address    | http://www.uwe.ac.uk/facults/fas/  
| Contact Person | Dr Frank Burnet (admissions tutor) or Zoe Murden (course secretary)  

Introduction

Are you concerned about issues like animal experiments, nuclear waste or genetic engineering? Do you ever watch science programmes on TV and wonder about the ways they explain scientific developments to us? Do you ever wonder why certain scientific ideas took hold while others were resisted? Do you imagine how science might change our lives in the future? Do you question whether science is freeing us from superstition or
trapping us into a narrow world view? If your answer to any of these questions is 'yes', then you might be interested in this unique degree.

**BA(Hons) Science, Society and the Media**

In recent years there has been increased demand for graduates who understand science and can present it effectively and imaginatively. This degree, is designed to meet that demand by combining rigorous scientific practice with cultural and historical analyses, media techniques and the exploration of scientific issues. The degree presents key ideas in science and asks what role these ideas play in our everyday lives and how these roles have developed historically. The forging of a partnership between staff in the Faculties of Applied Sciences and Humanities has resulted in a highly integrated programme employing innovative teaching methods.

If you have a mixed science/humanities background this three year full-time degree is particularly attractive and accessible. However, do not be put off if you have no formal qualifications in science because the degree is designed to cater sensitively to your needs and many students in your position have already succeeded in adapting to the demands placed upon them.
The program

There are four interrelated themes:

- How Science Developed: the way ideas about science have been shaped by society at different times, and the way science has in turn influenced society.

- Communication and Science: introduces media techniques such as feature writing, desk top publishing, front-of-camera presentation and methods of media analysis.

- Issues of Current Concern: examines issues like sustainable development, cancer treatments, and nuclear power. The science involved will be explored as well as the cultural and social considerations that envelop it.

- The Practice of Science: gives first-hand experience of doing science as well as underpinning the other areas of the degree. You will learn how to evaluate scientific data and make links between theories and experiments.

The content is regularly updated to keep the degree focused on contemporary issues.
3.18.27 Wellcome Institute for the History of Medicine, London

<table>
<thead>
<tr>
<th>Name</th>
<th>Wellcome Institute for the History of Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>183 Euston Road</td>
</tr>
<tr>
<td></td>
<td>London NW1 2BE, UK</td>
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<tr>
<td>Phone</td>
<td>0171 611 8551</td>
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<td>Fax</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Miss Sally Bragg</td>
</tr>
</tbody>
</table>

Profile

In 1976 a Scheme of Association was established between the Wellcome Institute for the History of Medicine and University College London, whereby academic staff became attached to the Wellcome Institute, and members of the Academic Unit were recognized as teachers within University College London.

Education

The two units function as an integral whole and are responsible for a broad-based academic programme offering a variety of undergraduate and postgraduate courses:
3.18. UNITED KINGDOM

- An intercalated BSc in the history of medicine is offered to a limited number of medical students from any medical school in the UK, who have completed the preclinical portion of their studies;

- Intercollegiate history options in the history of medicine are taught by members of the Unit - these are available to history undergraduates from any college in the University of London;

- The Academic Unit is a constituent part of the London Centre for the History of Science, which coordinates the teaching for the MSc in the History of Science, Medicine and Technology as well as organizing discussion meetings and symposia;

- Staff supervise higher degrees (MPhil, PhD, MD) and work with postdoctoral research fellows and visiting scholars.

The Unit also runs an academic programme of symposia, seminars and lectures that are open to the medical and academic public. The History of Twentieth-Century Medicine Group organizes a separate series of monthly seminars and Witness Seminars and publishes the newsletter.

All academic staff are available to supervise higher degrees (MPhil, PhD, MD). Applicants will not ordinarily be considered unless they have taken the MSc in the History of Science,
Medicine and Technology, or have a good first-degree in a history of science subject. Interested persons should send a short CV and résumé of the proposed research project.

### 3.19 Northern Ireland

#### 3.19.1 History and Philosophy of Science, Belfast

| Name                  | History and Philosophy of Science
|                       | The Queen’s University Belfast
| Address               | Department of Scholastic Philosophy
|                       | 15 University Square, Belfast
|                       | Northern Ireland
| Phone                 | +44 (0) 1232 245133 (Switchboard)
| Fax                   | +44 (0) 1232 245133 (Switchboard)
| Email                 | dquigley@clio.arts.qub.ac.uk
| WWW address           | http://www.qub.ac.uk/pas/hps/
| Contact Person        |

**Profile**

History and Philosophy of Science investigates the origins, development, and nature of scientific thinking about mankind and the natural world. It also explores the interactions between scientific ideas and their cultural and social environment. Among its characteristic concerns are the demarcation between "sci-
ence' and 'non-science' (magic, astrology, alchemy), the relations between science and philosophy and between science and religious beliefs, the nature of scientific change and revolution, the interactions between scientific thought and social and political forces, and the transmissions of scientific knowledge from one culture to another.

HPS offers a valuable way for science students to explore the broader implications of their more technical work. For non-scientists it offers a way of trying to understand how science functions without becoming involved with the technical details. HPS is thus a valuable subject for anyone intending to take up a career involving the interaction between science and industry or science and government.

Education

History and Philosophy of Science (HPS) is a non-departmental subject offered by the School of Philosophical and Anthropological Studies. Level 1 modules are available to students in most faculties, and are often taken by students in the faculties of Arts, Economics and Social Sciences, Medicine, Science, and Theology. Level 0 students in the Faculty of Science may take Level 1 HPS modules (if they subsequently take HPS at Level 1 they may not repeat the same modules). In the Faculties of Arts and Economics and Social Sciences, students may proceed to joint, minor or combined honours in HPS. Students in the Fac-
ulty of Science who have two free modules per year may take
the equivalent of minor honours in HPS. Students taking hon­
ours in any other subjects may take Level 3 modules as options
in Years 2 or 3, subject to limitations specified below.

There is no taught postgraduate course in HPS. The degrees
of M.Phil. and Ph.D. are available by research. The staff will
supervise research in topics related to their own interests (see
staff list). Applicants should preferably have some undergradu­
ate experience in HPS or a related subject. Training in science
is not normally an adequate background for research in the his­
tory of science.

3.19.2 Northern Ireland Technology Centre, Belfast

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<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>The Queen’s University of Belfast</td>
</tr>
<tr>
<td>Address</td>
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<td>Belfast BT9 5HN, Northern Ireland</td>
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<tr>
<td>WWW address</td>
<td><a href="http://www.nitc.qub.ac.uk">http://www.nitc.qub.ac.uk</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Professor E.K. Beatty</td>
</tr>
</tbody>
</table>
Profile

The Northern Ireland Technology Centre (NITC), located in a 1600 sq.metre purpose built facility on the Queen's University of Belfast campus, operates as a practical experience centre dedicated to technology transfer. The Centre is self-financing with income from industrial services providing 95% turnover. The remainder is derived from a University grant to support student training. The full-time staff includes 33 engineers, designers and technicians. The aims and objectives of the Centre are to:

- Provide effective technology transfer to industry and academe
- Ensure maximum use of today's technology today
- Provide a centre for good practice in CADCAM technology Operate an effective product and process development centre for local small/medium enterprises
- Keep key industrial staff aware of new technology
- Prepare engineering students for industry

Education

The Training Unit, based within the Technology Centre is pleased to present another annual programme of short courses
from the College of Engineering at Queen’s University. Over 10,700 delegates from local industry have attended the 730 courses that have run during the past twenty-seven years. We hope that the topics selected for the 1997-98 programme continue to meet industry’s need for the updating of key staff in the application of technology and management skills.

1997-1998 Programme:

- Computer Aided Design & Engineering
- Management Development
- Quality Assurance
3.20 Ukraine

3.20.1 Centre for S&T Potential and Science History Studies, Kiev

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<tr>
<th>Name</th>
<th>Centre for S&amp;T Potential and Science History Studies National Academy of Sciences of Ukraine</th>
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<tbody>
<tr>
<td>Address</td>
<td>60 Shevchenko Boulevard 252032 Kiev, Ukraine</td>
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<tr>
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<td>+ (380)-44- 216-95-91</td>
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<td>Email</td>
<td><a href="mailto:steps@carrier.kiev.ua">steps@carrier.kiev.ua</a></td>
</tr>
<tr>
<td>Contact Person</td>
<td>Dr. Boris Malitsky</td>
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</tbody>
</table>

Profile

The Centre for S&T Potential and Science History Studies of the National Academy of Sciences of Ukraine (STEPS Centre) is a leading research institution in the area of S&T studies in the former Soviet Union. It was created in 1991 as an completely independent research institution. Before this time it was working as a part of some other research institutes of the Ukrainian Academy of Sciences (since 1966). Now (in 1997) it has five main research departments:
• History of science
• Sociology of science
• Science policy
• Methodology of project assessment and expertise
• Scientific and technology forecasting and scientometrics

74 Persons, including 43 researchers and 5 professors worked in the Centre at the end of 1997.

Education

STEPS is a unique institution of this type in the Ukraine. It has the right to award both Candidate of Science and Doctor of Science degrees (highest scientific degrees in Russia and Ukraine).

STEPS Centre has a post-graduate programme in 3 specialities with about 15 students:

• Economics and management of R&D
• S&T innovation processes
• History of S&T

The lectures for the 3-year programme are in Russian and Ukrainian, but students have to pass an exam in English, French or German. Exams usually take place in October each year.
Costs and admission criteria

Admission Criteria:

- certificate of completion of higher education
- success in 3 exams (foreign language, philosophy and specialisation) (one from 3 - see above)
- dissertation (or to provide copies of published articles).

The programme is free for Ukrainian citizens (they obtain stipends of about US$ 100 per month), for foreigners rules are changing quite often. It is best to ask about the costs just before admission. Two years ago it was about US$ 2,500 per year (for all institutes of the Ukrainian Academy of Sciences).

National and international collaboration

The Centre has a number of research programmes with various Ukrainian Ministries, and in particular the Ministry for Science, Technology and Innovation Policy, with the national Foundation for Fundamental Research and some other institutions. Every two years since 1966, STEPS Centre has been the host institution for the Kiev International Symposium on the science of science and S&T forecasting.

The Centre cooperates moreover with:
• National Taras Shevchenko University in Kiev, Ukraine (Prof. D. Tcervaniov)

• WZB, Berlin, Germany (Prof. W. Meske)

• Institute for S&T History Studies, Russian Academy of Sciences, Moscow, Russia (Prof. V. Orel)
Chapter 4

Science, Technology, and Innovation Studies: Designing the Future?

This chapter focuses on some of the many intriguing themes in science, technology, and innovation studies. As has been noted in the introduction, this chapter can be used as a topical entry to the STI studies in this guide. It is by no means an exhaustive list of the subjects studied and taught in the European STI centres, as will be clear for everyone who has browsed through the preceding pages.

The main goal of the chapter is to show what kind of prob-
lems are tackled in STI studies and to provide a window on the variety of ways in which science, technology, and innovation can be studied meaningfully. This is especially relevant since the field of STI remains a dynamic field where new combinations of insights are appearing continuously. In each of areas listed, only a set of snapshots of the field could be provided. Soon new projects and research lines will emerge, although the theoretical substance of many a project will remain.

Moreover, instead of trying to be as complete as possible within every problem area, the chapter exemplifies one project in every area, carried out at one of the European STI centres. Of course, the same topic will often be addressed at a number of sister institutions. To enable the reader to quickly check these other centres, each section lists an index of these centres at the bottom. The chosen examples do not mean that they would be more interesting than those not chosen: more often than not a choice had to be made out of equally interesting projects.

This means that the various centres are grouped according to their research profile and their academic specialties. This does not preclude them from being active in other domains as well, of course. Indeed, many STI centres have a surprisingly wide area of interest and research initiatives. The index lists do not pretend to be more than a listing of the most characteristic activities of the various centres. The chapter is also aimed at stimulating the readers to contact the centres themselves, take a look at their homepages, and delve somewhat deeper in the
issues than can possibly be covered in an overall guide like this. After all, nothing beats self-study.

4.1 The new techno-culture: Will it be more participatory?

4.1.1 Towards a virtual society?

The world-spanning information networks and the way they change daily life is one of the most important developments studied in STI centres all over Europe. Contrary to technology oriented disciplines, STI centres do not take the technical issues to be the main driving forces of innovation in this area. Rather, culture and social relationships are put at the centre of the analysis.

Are fundamental shifts taking place in how people behave, organise themselves and interact as result of electronic technologies? This is the central question addressed by a new Research Programme funded by the Economic and Social Research Council (ESRC) in the UK, led by the STI centre at Brunel University: the “Virtual Society?”. The researchers expect the answers to have a crucial bearing on commercial and business success, and on the quality of life.

According to the project description, new electronic technologies are widely regarded as the impetus for radical changes.
Interactive and multimedia communications, internet, video conferencing, virtual realities, computer-aided design, the information super highway, and the new technologies of electronic surveillance and consumer profiling, are set to modify the nature and experience of interpersonal relations and communications and the form and substance of social control, participation and cohesion. The development of new information and communication technologies is central to emerging industries and regulatory policies throughout the world, based on the recognition that the new electronic information and communication technologies is key to future vitality. UK and European White Papers on Growth and Competitiveness, and users in industry, have in turn identified the social context in which technologies are actually used as a key area which is poorly understood.

The Virtual Society (VS?) Research Programme aims to shape policy and practice through a better understanding of electronic technologies and information infrastructures. In order to capitalise on the value of social science research in this area, a key emphasis of the Programme is to enhance and promote new and better forms of interaction between technical and social scientific expertise, between academics and industrialists, between researchers and the business community.

VS? has three main themes:

- Skills and Performance: the impact of new electronic
4.1 THE NEW TECHNOCULTURE

and communications technologies on human and organisational potential, performance and learning. How have electronic technologies developed as they have and what is the impact on human and organisational performance?

- Social Cohesion: the role of new electronic techniques in relations between people and in modifying processes and degrees of social inclusion and exclusion. This theme examines the ties which link people together and mechanisms of governance, social control, inclusion and exclusion.

- Social Contexts of New Electronic Technologies: the changing social contexts and factors influencing the transformation and adoption of electronic technologies. Social contexts present difficult-to-analyse sources of risk for investors, managers and communities. Research is directed to the manner in which technologies are rejected, adopted or adapted and deployed in specific settings.

STI Centres studying information societal problems

- Centre for Intellectual Property Rights Louvain (page 34)

- Cellule Interfacultaire de Technology Assessment (page 37)
CHAPTER 4. DESIGNING THE FUTURE

- Centre de Recherches Informatique et Droit (page 42)
- Law and Management in Communication and Information Technologies (page 45)
- Interdisciplinary Centre for Law and Information Technology (page 51)
- SMIT (page 54)
- Laboratoire d'Etudes sur les Nouvelles Technologies de l'Information (page 61)
- CRRM (page 109)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- Institut für Soziologie Munich (page 140)
- Wissenschaftszentrum Berlin (page 156)
- Centre for Technology and Society (page 235)
- University of the Basque Country (page 247)
- Section of Science and Technology Studies (page 281)
- Department of Technology and Social Change (page 284)
4.1.2 **New media, new rules?**

The new media challenge existing societal structure in a variety of ways. Many STI centres have started studying the emerging cyber-society, and its impact on present-day rules. At the STI centre in Leuven (ICRI), Belgium, a PhD project studies the legal status of public information in the context of convergence between telecommunications and audiovisual media.

The focus of the research, the project description states, will be the legal status of freely accessible information (as opposed to private information) in a context of growing convergence between audiovisual communications and telecommunications. The starting point must be the existing legislation governing mass communication, in particular, the print media and radio and television broadcasting. The law governing the Press and broadcasting seem to relate to the same subject i.e. publicly available information, even if this information is being disseminated using different carriers. Moreover, both of the aforementioned branches of law serve the same purpose, namely, maximising the citizen’s freedom of communication. The substance
and the objectives of the law governing mass communications do not necessarily change as a result of the introduction of new information technology. Conversely, the legal instruments that have been used to realise these objectives down through the years, have altered simultaneously with the rise of the ever more powerful media. In that sense, even if the same subject were concerned, a certain degree of legal divergence has always existed depending on the carrier-technology and the communication pattern. The intertwining of telecommunications, broadcasting and cable infrastructures does not necessarily give rise to a unified legal status for all the information circulating.

The existing legal instruments regulating the transmission of information through different media will serve as an interesting starting point for identifying "public" information being carried by new infrastructures, and for selecting the best strategy to guarantee the unchanging objectives of "media law" in a future converging communications environment. Traditional telecommunications and broadcasting infrastructures are now used for both private and public communication (as well as for other intermediary communication types). Hence, their legal status has to be unified, and, at the same time reflect the requirements which flow from the public character of (some of) the information transmitted. At the higher level of the communications model, a legal framework of electronic public information services will have to be worked out. Therefore, concepts from media law, broadcasting law and possibly other legal areas will
be applied.

**STI Centres studying the new media**

- Centre for Intellectual Property Rights Louvain (page 34)
- Science Studies Centre (page 299)
- Cellule Interfacultaire de Technology Assessment (page 37)
- Centre de Recherches Informatique et Droit (page 42)
- Law and Management in Communication and Information Technologies (page 45)
- Interdisciplinary Centre for Law and Information Technology (page 51)
- SMIT (page 54)
- Laboratoire d’Etudes sur les Nouvelles Technologies de l’Information (page 61)
- Centre de Sociologie de l’Innovation (page 106)
- CRRM (page 109)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
4.1.3 Local versus global cultures?

At the turn of the millenium, new telecommunications are shaping social life worldwide in a far-reaching manner. But how will these turn out for our self-understanding? The new technoculture will deeply affect the way human identity is perceived and experienced, but how will this shape our future? One of the projects aiming to provide partial answers to these crucial
4.1 THE NEW TECHNOCULTURE

questions, and to generate more ways to address the question, relates to political identity and is carried out in the STI centre in Madrid, Spain.

Impacts associated with these technological developments affect both economic globalization and territorial identities, the project paper states. These latter trends, apparently contradictory, bring with them elements of rapid social change and uncertainty. This paper reflects on the conjunction of both dimensions of the local and the global, and carries out a prescription of the progressive consolidation of a new cosmopolitan localism within the meso-level of community life.

A theoretical review of concepts such as multiple identities or territorial accommodation serves as an introduction to the subsequent discussion on the effects of globalization, the extension of market values, and the loss of power by the nation states. A critical digression on the diffusionist, functionalist, and neo-institutionalist approaches seeks to illustrate some conceptual misunderstandings regarding identity and territory. Mesogovernments no longer depend upon the rationalising actions taken by central bureaucracies and elites within national arenas. At present, some minority nations, small nation-states, regions and conurbations appear to be better equipped to maximise the impacts associated with downward and upward developments. These relate to global action and local identities, respectively. References made to the European context seek to illustrate how the interaction of multiple identities makes pos-
sible a more effective access of civil society to the process of decision-making. This process finds its expression at various political and institutional levels within the wider framework of transnational europeanisation.

This project deals primarily with the interaction between the local and the global, the revival of territorial identities, and the increasing incidence of the meso-level in contemporary life. The focus on territoriality should not be considered as the neglect of other forms of societal identities also affected by globalisation. However, our main area of analysis concerns identity and territory.

At the turn of the millenium, citizens face a situation of advanced modernity with some perplexity. They have discovered new horizons in the understanding of their own collective and individual life within a climate of uncertainty and rapid change. To a large extent, all these transformations have been made possible by the telecommunications revolution.

Nowadays, individuals and groups have immediate access to a wide range of endless data, information, and news generated in the remotest corners in the earth. The integrated networks of personal computers, TV terminals, and Web servers allow for a reciprocal and fluid communication between the house or workplace and the multifaceted external world. One consequence of these technological developments is the higher degree of democratisation in the processes of dissemination and exchange of information.
A myriad of facts, including those related to cultures and collectives all over the world are now available to the general public. The ‘digestion’ of such avalanches of information increasingly conditions economic, political, and social activities. The restriction of information and representation images characteristic of power practices in the past has been progressively replaced by the efficient management of overwhelming masses of information produced swiftly and without restraint.

In parallel, the growing attachment of citizens to communities at local and meso-level is also noticeable, particularly in Europe. Such communities are of rather analogous socio-economic characteristics and are politically situated in a somewhat equidistant position between the nation-state (or multinational state), and other transnational bodies and institutions (EU, GATT, G-7, IMF, NAFTA, WB, WTO). Territorial identities associated with these communities have provided new political underpinnings for citizens and groups.

The drive towards rebuilding relationships between the in-and out-spheres of human existence is shaped by citizens’ internalisation of practicalities and values related to a global context affecting matters of everyday life. Identities are in the midst of such a process of re-definition, with crucial derivations for political culture, social mobilisation, and political institutions. The most important factor in all aspects of globalisation can be considered as perceptive. Interpretations claiming that a blurring of local markers would follow the globalising trends
should nevertheless be qualified. In fact, we are witnessing a reinforcement of community identities at the sub-state level, a trend counteracting the simple assumption of a dehumanising and undemocratic Brave New World.

**STI Centres studying changing cultures**

- Science Studies Centre (page 299)
- Department of Social Studies (page 80)
- Centre de Sociologie de l’Innovation (page 106)
- Department of Sociology and Social Policy (page 362)
- Groupe d’Etude et de Recherche sur la Science (page 112)
- Department of Social Sciences, Loughborough University (page 378)
- Centre for Technology and Society (page 161)
- Cultural and science studies (page 181)
- Centre for the History of Science, Technology and Medicine (page 309)
- Department of Technology and Society Studies (page 199)
4.1 THE NEW TECHNOCULTURE

- Science and Technology Dynamics (page 206)
- The Netherlands Graduate School of Science, Technology and Modern Culture (page 210)
- ESST University of Oslo (page 221)
- Department of Technology and Social Change (page 284)
- Centre for Research into Innovation, Culture and Technology (page 326)
- Centre for the Study of Science Policy (page 339)
- Research Unit on Science and Technology Policy (page 255)
- Graduate Research Centre in Culture and Communication (page 351)
- Science and Technology Studies Unit Anglia (page 395)
- Science Studies, Edinburgh (page 398)
- STS@UCL (page 415)
- Wellcome Institute for the History of Medicine (page 430)
4.1.4 Which future for democracy?

The technological culture has important implications for European citizens. As the mad cow disease has shown, science and technological innovation can profoundly disturb society in all its aspects and at all levels. The way science, technology, and innovation upset the present democratic institutions and relationships in Europe, and at the same time may create opportunities for novel forms of democracy, is one of the issues studied and discussed at many STI centres mentioned in this guide. The wish to empower people and prevent them from being alienated from their own lives is a strong motive in science, technology, and innovation studies. Special attention is thereby paid to the global communication and information networks which are increasingly the dominant networks through which power flows. How do they enable citizens to participate and influence their own future? In what way do they create new barriers for true social and political democracy? Why does technology so often appear to be uncontrollable and alien?

At the STI centre in Munich, for example, ecology and politics is taught in a seminar for advanced students. In groups of 25 to 50 students, four hours a week, the explicit and implicit politics contained in environmental claims, environmental knowledge and regulation measures are discussed. The students are expected to critically challenge both realist and constructionist approaches. The current debates in environmental sociology
are highlighted via case studies of global climate change, deforestation, ozone depletion and local mobility. Ideas about "sub-politics", "cultural politics" and "le parlement des choses" are confronted with deep ecological issues as well as with classical political problem solutions. Students conclude this course with writing a 25 to 30 page paper discussing special aspect of these issues.

**STI Centres studying STI, politics and democracy**

- Institute for Philosophy and Social Studies of Science (page 24)
- Science Studies Centre (page 299)
- Centre of Science, Technology and Society (page 97)
- Group for Technology Studies (page 91)
- Centre de Sociologie de l’Innovation (page 106)
- Groupe d’Etude et de Recherche sur la Science (page 112)
- Institute for Science and Technology Studies (page 136)
- Institut für Soziologie Munich (page 140)
- Wissenschaftszentrum Berlin (page 156)
• Centre for Technology and Society (page 161)

• Cultural and science studies (page 181)

• Department of Technology and Society Studies (page 199)

• Science and Technology Dynamics (page 206)

• The Netherlands Graduate School of Science, Technology and Modern Culture (page 210)

• ESST University of Oslo (page 221)

• Norwegian Institute for Studies in Research and Higher Education (page 225)

• Centre for Technology and Society (page 235)

• Section of Science and Technology Studies (page 281)

• Department of Technology and Social Change (page 284)

• Centre for Research into Innovation, Culture and Technology (page 326)

• Research Unit on Science and Technology Policy (page 255)

• Centre for the Study of Science Policy (page 339)
4.1 THE NEW DYNAMICS

- Department of Innovation Studies (page 357)
- PREST (page 384)
- Science and Technology Studies Unit Anglia (page 395)
- SPRU (page 403)
- Science Policy Support Group (page 412)
- STS@UCL (page 415)

4.2 Innovation: Where is the new dynamics?

4.2.1 Europe an information society?

The relationships between the universities, governments and industry and service sectors has rapidly been changing in recent decades. One theoretical model used to capture these changes is “the triple helix”. These changes are moreover the focus of empirical research projects. They try to gauge how far-reaching the transformations really are, and what they imply for innovative knowledge creation and social and economic development. An all-European project uniting STI research teams from seven countries (the Netherlands, Italy, Greece, Denmark, Germany,
Switzerland and the UK) tries to use novel theoretical notions to better understand the emerging European system.

In recent years various theories have been developed about the relation between the development and change of organisations, and the disturbing events that can occur in their environment. It has increasingly been recognised that this relation is not one of first order cybernetic control (i.e., when initial conditions can be manipulated in order to determine later events). Social organisation can be described more adequately by the notion of networks of communication that evolve recursively and interactively among human actors as their reflexive carriers. Such "selforganising" networks constitute the subject of second order cybernetics: the study of emergent order and its control.

The research teams intend to apply these relatively new theoretical insights to specific experiences related to the emergence of the "European Information Society". The project shall analyse:

- science & technology policy options emerging from RTD-networks
- innovation and (trans)regional development in SME-networks, and
- cultural dimensions added to these processes of change by new ways of communicating (like CMC).
In a fourth project the results of the three projects are self-monitored and disseminated by exhibiting them to relevant audiences while using methods and tools of second-order systems theory and CMC, reflexively.

In this consortium of (mainly academic) research centres, sociological and computer science expertise are brought together. The common root of these two intellectual traditions is the "radically constructivist" assumption of self-organisation theories: sociological reconstructions can be combined with the engineering perspective of the computer sciences. This recombination of qualitative understanding and quantitative modelling is expected to stimulate the development of new methodologies.

The theoretical system of reference for our studies is the emergence and evolution of European networks in an information society. The project has selected three important areas in the innovation process, specifically the development of the RTD system and the development of regional economic systems, and thirdly the development of information networks emerging at the interface of science, economy, and government. These different networks can be analyzed in terms of the fluxes of communication between the participants involved.
STI Centres studying the changing relationships between academia, industry and government

- Centre for Intellectual Property Rights Louvain (page 34)
- Centre of Science, Technology and Society (page 97)
- International Institute for Applied Systems Analysis (page 28)
- Institute for Philosophy and Social Studies of Science (page 24)
- IKE, Department of Business Studies (page 64)
- Institute for Industrial Economics and Strategy (page 71)
- Department of Industrial Economics and Strategy (page 76)
- Group for Technology Studies (page 91)
- Bureau d’Economie Théorique et Appliquée(page 95)
- Centre de Sociologie de l’Innovation (page 106)
- Groupe d’Etude et de Recherche sur la Science (page 112)
- Institut de Droit et Economie de la Firme et de l’Industrie (page 118)
4.2 THE NEW DYNAMICS

- Economics and sociology of R&D (page 122)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- Institute for Science and Technology Studies (page 136)
- Center for Science and Technology Studies (page 186)
- Maastricht Economic Research Institute on Innovation and Technology (page 189)
- TNO Centre for Technology and Policy Studies (page 196)
- Science and Technology Dynamics (page 206)
- The Netherlands Graduate School of Science, Technology and Modern Culture (page 210)
- Research Unit on Science and Technology Policy (page 255)
- Nordic Center for Innovation (page 275)
- Department of Technology and Social Change (page 284)
- Centre for Research in Innovation and Competition (page 321)
4.2.2 The service sector — a new global player?

The industrialised countries are already advanced service economies. Typically service sectors, or the tertiary sector, as defined through public statistics represent more than two-thirds of employment. A substantial fraction of the value-added in any one country originates in the service sectors. Industrialised countries are undergoing significant structural and socio-economic changes, with services playing an important role in these changes. Many sectors of economic activity are running through phases of rapid internationalisation and globalisation,
restructuring competitive markets and potentialities for growth. International integration and processes of national deregulation imply changed "rules of conduct" for previously home-based service activities.

With these aggregate trends it is paradoxical that service activities is a blind spot in many national innovation and technology policies. It is this paradox that the SI4S project at the STI centre in Oslo (STEP), Norway, aims at clarifying. The activities, started in 1996 and running through 1998, will according to the project authors enable the development of recommendations for policy formulation towards national innovation policy makers, with a scope encompassing the complementarities between different economic sectors. The recommendations that emerge from this study will by their scope facilitate the inclusion of the systemic aspect of innovation and structural processes, as well as development of a sui generis service innovation policy.

The SI4S project aims at developing concepts, empirical evidence, and proposals for practical action concerning the role of services in innovation systems. It will proceed via a series of work packages that will enable us to examine the role of services as users, originators, modulators and agents of transfer of innovations. We will determine the factors which shape services' roles; how these factors are themselves changing; and what role policies and business practices have in creating favourable contexts for the innovation of services. The project activities are designed with the objective of understanding ser-
vices’ roles in structuring and developing innovation systems in a comprehensive and integrated approach. A better understanding of service innovation processes may enhance policymakers’ and business decision-makers’ abilities to promote innovation processes in services and strengthen their facilitating and intermediating role towards other industrial sectors.

The dynamic role of services in these systems will be analysed; including the role of alliances and partnerships with and within services, user-producer relations where services are involved and the role of public research for these activities. A comparison with European countries concerning the situation and policies will be included. The study will attempt to identify "best practices" in services innovation policies.

STI Centres studying global economic development

- Centre of Science, Technology and Society (page 97)
- Department of Sciences, Philosophies, Societies (page 48)
- International Institute for Applied Systems Analysis (page 28)
- Studies on Media, Information and Telecommunication (page 54)
- IKE, Department of Business Studies (page 64)
4.2 THE NEW DYNAMICS

- Institute for Industrial Economics and Strategy (page 71)
- Department of Industrial Economics and Strategy (page 76)
- Bureau d’Economic Théorique et Appliquée (page 95)
- Institut de Droit et Economie de la Firme et de l’Industrie (page 118)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- Institute for Science and Technology Studies (page 136)
- Istituto di Ricerca sulla Dinamica dei Sistemi Economici (page 176)
- Maastricht Economic Research Institute on Innovation and Technology (page 189)
- Max Planck Institute for the Study of Societies (page 146)
- University of the Basque Country (page 247)
- Nordic Center for Innovation (page 275)
- Department of Technology and Social Change (page 284)
4.2.3 Moving to a mobile world?

Any discussion concerning the automobile is inherently complex, because the automobile can be seen as a mediator between humans and their social, cultural and natural environments. This is the perspective taken in the transport research program MACS at the STI centre in Gothenburg.

The research group MACS is studying the social and cultural roles and effects of automobility, not only in order to pinpoint the obstacles confronting the implementation of solutions to safety or environmental problems in connection to the use of the car, but also in order to find openings and possibilities for such solutions. MACS is interested in creating a knowledge base which analyses attitudes, patterns of behaviour, and patterns of thought in relation to automobility within different social and cultural contexts. This field has until now mostly been overlooked in other research programmes, whose focus...
have been on the technical and natural scientific aspects of automobile use. For this reason, MACS represents a viable and relevant research area.

Due to the breadth of this subject and the myriad of possibilities of discussing the social and cultural aspects of automobility, the members of this research programme have maintained their individual disciplinary perspectives and have developed their own areas of research, areas which still share a similar view of the automobile's place and role in society.

Since 1992, one of the projects concentrates on the electric car. Financed by the Swedish Transport & Communications Research Board, Electric and Hybrid Electric Vehicle Programme, the developments and activities pertinent to the supposed revival of electric propulsion in automobiles has been studied. Both the U.S. and Japan have been in focus, with special attention directed towards the California rulings on the so-called zero-emission vehicle mandate, the controversy it stirred up and the developments it initiated.

The project's aim is twofold:

- to map out and analyse the actors and their activities, in the field of electric cars, in order to accumulate to the understanding of socio-technological dynamics. To what extent, for example, is it possible to influence the pace and direction of technological change in an area of technology which constitutes one important and integrated
part of our society? Why is it so that some technologies are viewed as being inherently unrestricted in solving various problems, whereas others (e.g. electric cars) are being viewed as inherently constrained. What consequences will such views have on technology development, aims and strategies?

- to increase the preparedness for a possible radical change in transportation technology. Given the current discussions among car manufacturers about electric car related technologies as an important future technological route, and given the focus on actors as the ‘force’ behind technological change, the project follows these discussions and technology developments very closely. Traditionally, transportation technology has long been viewed as a fairly stable technological area, a fact has been used as an (inductive) evidence of a continued stability of the future. The recent processes are distinctively different from the past, when it comes to scope and intensity, and the risk or possibility of it making a difference should not be neglected. After all, according to the researchers, “radical changes in technology do happen!”

This approach to technology, the researchers state, belongs to the academic field of social-scientific studies of technology and science. Based on mainly primary textual sources, as well
as interviews with several of the key actors, the analysis has been conducted close to what is usually termed as history of technology, and sociology of technology. The method may be regarded as history-comparative and contextual. The material on the recent activities is thus analysed in relation to an history-and technology-comparative framework.

**STI Centres studying the transport systems**

- Cellule Interfacultaire de Technology Assessment (page 37)
- Institut für Soziologie Munich (page 140)
- Wissenschaftszentrum Berlin (page 156)
- Centre for Technology and Society (page 161)
- Section of Science and Technology Studies (page 281)
- Centre for the Study of Science Policy (page 339)

**4.2.4 Managing innovation: how can it be done?**

Both the production and the distribution of wealth are at the heart of innovation studies. Science and technology strongly affect the conditions in which we live, via the existing economic systems, and at the same time transform these systems. One of
the initiatives to better understand these interactions is the Danish research project DRUID. The objective of DRUID is to contribute to a better understanding of the dynamics of technical, structural and institutional change at the level of the single firm as well as at the inter-firm level and the level of the economy as a whole. Special attention is given to fundamental trends such as the growing importance of knowledge for competitiveness, the information technology revolution, the ecological crisis and the internationalisation of the economy.

The DRUID-research programme is organised in 3 different research themes:

- The firm as a learning organisation
- Competence building and inter-firm dynamics
- The learning economy and the competitiveness of systems of innovation

In each of the three areas there is one strategic theoretical and one central empirical and policy oriented orientation.

In the project "The firm as a learning organisation", the theoretical perspective confronts and combines the resource-based view with recent approaches where the focus is on learning and the dynamic capabilities of the firm. The aim of this theoretical work is to develop an analytical understanding of the firm as a learning organisation. The empirical and policy issues relate to
the nexus technology, productivity, organisational change and human resources. More insight in the dynamic interplay between these factors at the level of the firm is crucial to understand international differences in performance at the macro level in terms of economic growth and employment.

In the project “Competence building and inter-firm dynamics”, the theoretical perspective relates to the dynamics of the inter-firm division of labour and the formation of network relationships between firms. An attempt will be made to develop evolutionary models with Schumpeterian innovations as the motor driving a Marshallian evolution of the division of labour. The empirical and policy issues relate the formation of knowledge-intensive regional and sectoral networks of firms to competitiveness and structural change. Data on the structure of production will be combined with indicators of knowledge and learning. IO-matrices which include flows of knowledge and new technologies will be developed and supplemented by data from case-studies and questionnaires.

The third theme “The learning economy and the competitiveness of systems of innovation” aims at a stronger conceptual and theoretical base for new concepts such as ‘systems of innovation’ and ‘the learning economy’ and to link these concepts to the ecological dimension. The focus is on the interaction between institutional and technical change in a specified geographical space. An attempt will be made to synthesise theories of economic development emphasising the role of science
based-sectors with those emphasising learning-by-producing and the growing knowledge-intensity of all economic activities. The main empirical and policy issues are related to changes in the local dimensions of innovation and learning. What remains of the relative autonomy of national systems of innovation? Is there a tendency towards convergence or divergence in the specialisation in trade, production, innovation and in the knowledge base itself when we compare regions and nations?

**STI Centres studying innovation management**

- ESST at UCL, Louvain (page 59)
- Laboratoire d’Etudes sur les Nouvelles Technologies de l’Information (page 61)
- IKE, Department of Business Studies (page 64)
- Institute for Industrial Economics and Strategy (page 71)
- Swiss Federal Institute of Technology (page 296)
- Department of Industrial Economics and Strategy (page 76)
- Group for Technology Studies (page 91)
- Bureau d’Economie Théorique et Appliquée (page 95)
4.2 THE NEW DYNAMICS

- Scientific Management Centre (page 101)
- CRRM (page 109)
- Institut de Droit et Economie de la Firme et de l’Industrie (page 118)
- Economics and sociology of R&D (page 122)
- Higher Institute of Labour and Business Studies (page 240)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- Maastricht Economic Research Institute on Innovation and Technology (page 189)
- Northern Ireland Technology Centre (page 434)
- TNO Centre for Technology and Policy Studies (page 196)
- University of the Basque Country (page 247)
- Research Unit on Science and Technology Policy (page 255)
- Nordic Center for Innovation (page 275)
• Center for Technology and Management (page 289)
• Center for Management of Technology (page 292)
• ESST at EPFL (page 296)
• Management School Edinburgh (page 303)
• Centre for Research into Innovation, Culture and Technology (page 326)
• Centre for Research in Information Management (page 330)
• Centre for Complexity and Change (page 334)
• Centre for Social Theory and Technology (page 345)
• Manchester Business School (page 381)
• SPRU (page 403)
• STEP (page 229)
• Manchester School of Management (page 422)
• Centre for S&T Potential and Science History Studies (page 437)
• IADE (page 263)
4.2.5 A job for everyone?

Unemployment is one of Europe’s most pressing social and economic problems. At the STI centre in Valbonne, France, a special project is aimed at this problem area, “Industrial Dynamics and Employment in Europe IDEE”. The research project aims at explaining the relationship between the restructuring of the European economies and the employment issue, by considering its variable forms, its timing and evolution.

According to the project description, the disequilibria affecting European countries in the decades starting with the seventies have been interpreted as the result of the inability of markets to cope with and to adapt to major changes in the general, economic environment (changes in technology as well as in the conditions and forms of industrial competition) that themselves were correlated with information imperfections and with the absence of appropriate counter-balancing institutions and incentive rules. In particular, the occurrence of mass unemployment in Europe has been imputed to structural maladjustments associated with an over-regulation of labour markets. By contrast, the perspective pursued in this research relies upon an altogether different line of interpretation of past economic histories and events as well as of the current dynamic paths of the crucial monitoring variables.

The explanation of the diverging performances of the Western countries (notably, in terms of the dynamic behaviours of
unemployment) will not be sought uniquely in differences in the mechanisms controlling their labour market. It will also be located in their different investment behaviours. The disequilibria observed and their persistence, in fact, appear to be the shortcoming of inherited distortions in the structure of the countries’ productive capacity, which itself descend from the conditions under which the process of capital accumulation has taken place. The distortions to be taken into due consideration and to form the focus of our analysis are not those affecting the relations between production sectors, as the interdependence among them is necessarily changing along with the unfolding of innovation processes. They are, rather, the distortions which affect the relationship between investment and consumption within an economy while it is undergoing a process of qualitative change.

The research aims at producing an empirical analysis on a cross country comparative perspective, as the appropriate background for policy formulation and implementation. To this end, it will begin by examining data on major features exhibited by the processes of structural change in the recent histories of the European countries, and in particular the changes in the structure of their productive capacity. It will, then, turn to develop a model for the interpretation of the relationship between structural change and macroeconomic disequilibria. Next, it will focus on a broad analytical issue, to what extent structural changes explain the employment experience capturing its vari-
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The final target is the formulation of recommendations for policies acting on the vital connections between the macroeconomic scenarios, structural reforms and innovation-enhancing policy measures.

**STI Centres studying employment structure and dynamics**

- Science Studies Centre (page 299)
- IKE, Department of Business Studies (page 64)
- Department of Sociology and Social Policy (page 362)
- Institute for Industrial Economics and Strategy (page 71)
- Department of Industrial Economics and Strategy (page 76)
- Bureau d’Economie Théorique et Appliquée (page 95)
- Centre of Science, Technology and Society (page 97)
- Institut de Droit et Economie de la Firme et de l’Industrie (page 118)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
4.3 Shaping technology — Shaping society?

4.3.1 Creating new life forms?

The recent emergence of biotechnology has created a host of fundamentally novel challenges, moral dilemmas and economic opportunities. As one of the STI centres doing research in this area, the STI centre in Grenoble focuses on two themes: the
study of biodiversity and the organisation of research and development (R&D).

The maintenance of genetic heritage and the conservation of genetic diversity, necessary for scientific progress and plant breeding, involves an economic evaluation of the heritage available. The works of economists, realised in collaboration with geneticists, tend to define solutions permitting the maintenance of diversity at an acceptable cost while the corresponding biological methods for supporting diversity are still in the process of being developed. The models on which unit SERD works, take into account not only the scientific and technical uncertainty but also the geopolitical stakes, emphasised for instance at the Rio conference.

The analysis of the organisation of R&D is carried out at various levels - at the level of the firm and the laboratory, and at the level of the network in which the public laboratories, private laboratories, funding institutions, and the government participate, in order to examine the processes of innovation at the core of networks, and define the best modes of organisation. The co-ordination of the activities of research carried out within the firm or within innovation networks plays a central role in the production and diffusion of scientific knowledge and techniques. Applied to the biotechnology sectors and the seed industry, the research conducted by SERD focuses on the links between the appropriation of the research output, the modes of organisation and co-ordination, the possibilities for learn-
ing and the construction of core competence of the various actors. Different tools have been put to use: monographic studies, models, research followed up by action.

The research output of the members consists both of publications in national and international reviews, but also presents concrete solutions to the problems posed by their partners.

**STI Centres studying biotechnology**

- Centre for Intellectual Property Rights Louvain (page 34)
- ESST at UCL, Louvain (page 59)
- Economics and sociology of R&D (page 122)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- TNO Centre for Technology and Policy Studies (page 196)
- Research Unit on Science and Technology Policy (page 255)
- SPRU (page 403)
4.3 SHAPING

4.3.2 Novel foods, novel health?

A variety of research has been conducted on the development of medical science and technology, medicine, food and health services, the way industrial interests in these areas are intertwining with public interests and the way knowledge is generated on these issues.

At the STI centre at the Ecole des Mines in Paris, mostly known because of the actor-network theory, new attention has been directed towards questions of health, biology, body techniques and the over-consumption of drugs. The first research contracts have been studying the drug market (licit and illicit), comparative studies of birth-giving in Holland and France, and more recently two major French charities. According to the researchers, these studies have allowed the Centre to deploy a gamut of set ups and mechanisms that are responsible for the contemporary fabrication of the body.

The study carried out with the French charity AFM is emblematic of the new course of the CSI. The AFM raises important budgets from private campaigns, uses powerful media techniques such as Telethon, redefines the classical process of science policy through many innovative organisations and also, through genetic screening and the identification of new genes, deeply alters the linkages between parents and children, and connects questions of suffering and care with the most modern techniques in biological engineering. The crucial roles played
by patients and their families, the key question of secrecy, the power of the charity on the course of genetic mapping, the complicated function of the media, all of that is mixed in a series of innovations that are simultaneously scientific, medical, informational, social, legal, ethical and social. “A new definition of the linkages between science and society is clearly at work here.”

**STI Centres studying health, food and medicine**

- Cellule Interfacultaire de Technology Assessment (page 37)
- Department of Sciences, Philosophies, Societies (page 48)
- Scientific Management Centre (page 101)
- Centre de Sociologie de l’Innovation (page 106)
- Centre for the History of Science, Technology and Medicine (page 309)
- Economics and sociology of R&D (page 122)
- Institut de Recherche sur les Fondements et les Enjeux des Sciences et des Techniques (page 127)
- Institut für Soziologie Munich (page 140)
4.3 SHAPING

- Wissenschaftszentrum Berlin (page 156)
- Cultural and science studies (page 181)
- Department of Technology and Society Studies (page 199)
- Science and Technology Dynamics (page 206)
- Science and Technology Studies Unit Anglia (page 395)
- Science Studies, Edinburgh (page 398)
- Wellcome Institute for the History of Medicine (page 430)

4.3.3 Managing mother Earth?

Science and technology are heavily implicated in all disputes about the environment and nature conservation. At the STI centres at the Open University and Tilburg University, two projects studied the way the risks of genetically modified organisms are framed by the contesting parties and by regulatory bodies, focusing on herbicide-tolerant crop. When the UK proposed Europe-wide market approval of a herbicide-tolerant oilseed rape (canola), the proposal encountered dissent from other countries and environmental groups. In dispute were several regulatory boundaries - of administrative responsibility,
causality, acceptability, and evidence. The STI projects analysed these disputes about herbicide-resistant crop by looking at the way the problems were framed by the various actors and at the way boundaries of risk assessment were set. “These boundaries are often explicitly contested and thus provide rich material for analysing divergent framings of biotechnological risk.”

The study confirmed that the debate on herbicide-tolerant crop was an important test case for the safe regulation of the release of genetically modified organisms in general. The disagreements within the European Union took the form of boundary disputes, especially regarding the scope of relevant adverse effects. “By excluding some public and scientific concerns, the dominant stance restricted the capacity of the regulatory procedure to accommodate the wider risk debate”, according to the results. This in turn limited the legitimacy that a contentious product could gain from safety approval.

The project also led to implications for risk assessment in general. In general, this denotes a procedure that investigates specific harms. It assesses the extent or likelihood of effects already deemed unacceptable and plausible, especially those effects documented in previous cases. “For GMO regulation, however, ‘risk assessment’ is a misnomer. Regulators have no prior norm for defining unacceptable effects; rather they must devise such norms, especially at the stage of market approval.” Therefore, this novel type of regulation can be analyzed as “uncertainty-based”. It requires the management of normative
and predictive uncertainties. The regulatory process links those dual uncertainties by conceptually narrowing the range of effects whose (im)plausibility must be argued. "This involves normative judgments about tangible effects, about modes of environmental control, and even about ‘the environment’ to be protected.”

**STI Centres studying environmental problems**

- Centre for Environmental Economics and Environmental Management (page 31)
- Department of Environment, Technology and Social Studies (page 86)
- Institut de Droit et Economie de la Firme et de l’Industrie (page 118)
- International Institute for Applied Systems Analysis (page 28)
- Economics and sociology of R&D (page 122)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- Institut für Soziologie Munich (page 140)
4.3.4 Energy for the future?

At the STI centre in Karlsruhe, energy has been a topic of research since 1973, prompted by the high atmospheric emissions in the energy sector, the discussion on the exhaustion of resources, and by the oil prices which trebled in Autumn of that year. Initially, the centre developed "sectoral energy demand models" which accorded greater importance to energy efficiency, saturation processes and structural developments towards less energy-intensive modes of production. In the eighties, demonstration projects on rational energy applications using solar energy were developed. At the moment, three main areas of research are being developed:

- energy technology, in which the technical and economic possibilities for rational energy use are investigated
4.3 SHAPING

- energy economics, concerned with energy prognoses and structural influences on energy consumption and energy efficiency; with the export chances and barriers to use of energy saving goods; and with the social costs of energy use

- energy policy, focusing on comparative analyses and integrated energy policy concepts, as well as individual instruments such as further training, consulting, the price structuring of grid-based energies and subsidy programmes, and with the evaluation of these instruments.

The researchers work closely together with their colleagues studying environmental issues, particularly in the area of climate protection and the recycling of energy-intensive products. In general, the emphasis on energy problems in the public opinion has shifted to environmental issues and concern about the greenhouse effect. According to this STI centre, “great efforts are needed in order to attain the CO₂ reduction target for the whole of Germany, and fulfil the even more ambitious target of cities that have become members of the Climate Convention. It is also necessary to motivate and sensitise energy consumers and decision-makers. For this reason the emphasis is on practically-oriented measures which exemplify how energy efficiency can be improved, achieving social acceptance and a sustained impact.”
STI Centres studying energy problems

- Department of Environment, Technology and Social Studies (page 86)
- International Institute for Applied Systems Analysis (page 28)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- Institut für Soziologie Munich (page 140)
- TNO Centre for Technology and Policy Studies (page 196)
- Centre for Technology and Society (page 235)
- SPRU (page 403)
- IADE (page 263)

4.4 Knowledge generation

4.4.1 Gendered knowledge?

STI centres collaborate with gender and women studies groups to probe the power and gender structure of present-day science and technology. One such project, "@THENE" after the Greek
4.4 KNOWLEDGE GENERATION

goddess, tries to explore how far it is possible to construct a virtual learning community and attempt to create a sense of peer support in the virtual world. It is a joint endeavour of the STI centre at the University of East London and the women training centre NEWTEC. The project has three aims:

- to enhance access to IT-related higher education for students from non-traditional backgrounds, particularly women from ethnic minority communities.

- to implement teaching about multimedia technologies by using the technologies which form the content of the curriculum as modes of delivery.

- to explore the broader applicability of @THENE's mode of delivery and the implications of the project for the development of teaching and learning in the University and beyond.

The project should give women who have been out of education for some time the opportunity to improve study and communication skills while studying material relevant to the content of the existing degree programme. The distance learning element of @THENE Year Zero, equivalent to one-and-a-half days per week, helps students learn to study independently, to manage their time in order to study effectively, to structure their own learning and motivate themselves to study on their own. It
provides a flexible learning environment which will make the best possible use of tutors’ time, learners’ time and physical resources by allowing interaction between learners and tutors to take place at times convenient to both parties, thus not requiring tutors to be available at the same time as learners.

The project funds the purchase of individual workstations to be loaned to students in their own homes for the duration of the course. The project uses and assesses the value of a range of computer-based facilities, including on-line e-mail and video communication and multimedia study materials, for computer-mediated distance learning. The face-to-face element of the @THENE Year Zero requires students to attend classes at NEWTEC for 3 days per week.

At the end of @THENE Year Zero, students should:

- have developed analytical and reflective skills appropriate for progression into Higher Education
- have developed an understanding of the relationship between technology and society
- have developed a range of IT skills
- have developed a range of study skills and communication skills appropriate for progression in Higher Education
4.4 KNOWLEDGE GENERATION

- have developed skills and techniques for managing their own learning.

The technology is both the method and the subject of study. Such innovations around the use of technology in teaching are currently central to the development of educational delivery. An exploration of the effectiveness of this approach is central to the @THENE research project. @THENE students and the @THENE research project more generally will explore, for example, CD-roms, e-mail and the Internet as educational resources.

The women-only environment of also forms part of a teaching and learning strategy which recognises the need for single-gender education in areas where women traditionally lack confidence and are under-represented.

**STI Centres studying STI and gender**

- Science Studies Centre (page 299)

- Institute for Philosophy and Social Studies of Science (page 24)

- Department of Social Studies (page 80)

- Department of Sociology and Social Policy (page 362)

- Institute for Science and Technology Studies (page 136)
• Department of Social Sciences, Loughborough University (page 378)

• Centre for Technology and Society (page 161)

• Belle van Zuylen Institute (page 179)

• Science and Technology Dynamics (page 206)

• The Netherlands Graduate School of Science, Technology and Modern Culture (page 210)

• ESST University of Oslo (page 221)

• Department of Technology and Social Change (page 284)

• Graduate Research Centre in Culture and Communication (page 351)

• Department of Innovation Studies (page 357)

• Science and Technology Studies Unit Anglia (page 395)

• Science Studies, Edinburgh (page 398)

• STS@UCL (page 415)
4.4 KNOWLEDGE GENERATION

4.4.2 Public Knowledge?

The public understanding of science has been a major concern within STI studies from the very beginning. STI centres are critically involved in the dissemination of scientific knowledge and technological expertise. They also question the basic assumptions many scientists and policy officials depart from concerning the very nature of the process of science communication to the public, and the feedback this gives to the production of scientific knowledge itself. A specific tradition is materialised in the modern science museums. In Europe these have been strongly influenced by insights from science, technology, and innovation studies which has led to the concept of “science centres” with more emphasis on interactivity and hands-on experience in the exhibits. In the museum in Venice, an International Laboratory in the History of Science has initiated.

It brings together junior and senior scholars for seven to ten days each year to confront a focused and novel research topic through hands-on contact with instruments, techniques, as well as the study of texts. Approximately a dozen postdoctoral fellows meet with five or six senior scholars, experts in the topic to be dealt with in the particular year, for an intensive seminar under the sponsorship of one of the five participating institutions. The unity of the International Laboratory is one of approach rather than of theme: a workbench-like emphasis on the concrete sources of past scientific experience, whether embedded
in objects, mediated by techniques, or displayed in words and images.

The goals of the International Laboratory in the History of Science are:

1. to expand the preparation of younger scholars in the history of science and related fields by exposure to sources and methods not ordinarily included in graduate training;

2. to introduce techniques and perspectives from other disciplines (e.g. archaeology, cognitive science, art history) as they intersect with problems in the history of science;

3. to promote interactions of junior and senior scholars around a focused topic across national boundaries;

4. to stimulate research on new areas in the history of science by concentrating scholarly attention on them by means of the seminars.

The topics and sites for the next five years are as follows:

- USA Dibner Institute for the History of Science and Technology Cambridge, 1998 / Endicott House Conference Center: Hidden entities and the devices that manipulate them in the 18th and 19th centuries
4.4 KNOWLEDGE GENERATION

- GERMANY Max Planck Institut fr Wissenschaftergeschichte Berlin, 1999: Material culture of calculation

- ISRAEL Cohn Center, Tel-Aviv University Tel Aviv, 2000: Jewish and Islamic attitudes towards material culture and science in the Middle Ages


- GREECE Center for the History of Science, University of Athens Athens, 2002: Texts as instruments for the transmission of scientific knowledge from center to periphery

**STI Centres involved in science communication**

- Institute for Philosophy and Social Studies of Science (page 24)

- Science Studies Centre (page 299)

- Groupe d’Etude et de Recherche sur la Science (page 112)

- Institute for Science and Technology Studies (page 136)

- Institut für Soziologie Munich (page 140)
• Center for Science and Technology Studies (page 186)
• Department of Social Sciences, Loughborough University (page 378)
• Science and Technology Dynamics (page 206)
• The Netherlands Graduate School of Science, Technology and Modern Culture (page 210)
• ESST University of Oslo (page 221)
• Research Unit on Science and Technology Policy (page 255)
• Graduate Research Centre in Culture and Communication (page 351)
• Centre for Research into Innovation, Culture and Technology (page 326)
• International Institute for Applied Systems Analysis (page 28)
• Centre for the History of Science, Technology and Medicine (page 365)
• Institute and Museum of History of Science (page 178)
• Science Policy Support Group (page 412)
4.4.3 Knowledge, an invaluable instrument?

A specific branch within STI studies is technology assessment. Initially inspired by the US Office of Technology Assessment, a strong European tradition has been built up, with work done in most European countries. In 1994, the Institute for Prospective Technological Studies (IPTS) was created as one of the seven Research Institutes of the European Commission (EC). Following a brief pilot period, the IPTs constituted a ‘Technology Watch’ network, the European Science and Technology Observatory (ESTO).

ESTO is organised around a Co-ordination group composed of fourteen European institutions, all with experience in the field of scientific and technological assessment at the national level. These fourteen organisations form the ESTO Co-ordinating Group (ESTO-CG), have a formal obligation towards the IPTS and should eventually be the nucleus of a far larger network.

ESTO aims at detecting at an early stage scientific or technological breakthroughs, trends and events of potential socio-economic importance. ESTO members therefore share the responsibility of supplying the IPTS with up-to-date and high
quality scientific and technological information drawn from all over the world, facilitated by the network's broad presence and linkages. The main customer for these activities are European Science and Technology policy-makers, in particular within the European Commission. The information produced by ESTO will also be made available to a much wider audience, such as policy making circles in the Member States and decision-makers in both non-governmental organisations and industry.

Currently, ESTO is engaged in the following technology watch activities:

- Production of the 'IPTS Report', a monthly journal targeted at European policy-makers and containing articles on science and technology developments, either not yet on the policy-maker's agenda, but likely to emerge there sooner or later, or on aspects of such developments that have not yet been fully appreciated.

- Production of an annual 'Baseline Report' on techno-economic intelligence. The aim of this report is to provide a synthesis and interpretation of recent changes and developments in society and the economy which either derive from, or are further driving, technological change and innovation.

- A series of specific prospective projects, again targeted at European decision-makers, intended to act as a trigger
4.4 KNOWLEDGE GENERATION

for in-depth studies of European foresight nature, aiming at the identification and description of trends rather than static situations.

- A permanent technology watch function, achieved by means of a set of thematic networks providing input into an expert base on technology watch events and analysis. This will put ESTO and IPTS in the position of being able to provide rapid responses to specific requests from European decision-makers.

- The use of up-to-date information and communication technologies to enable cooperation between organisations distributed throughout the European Union, and later, all over the globe.

- The extension of the ESTO network beyond the original members and involvement of these in ESTO activities.

At present, ESTO consists of the IPTS and fourteen European organisations forming the ESTO Co-ordinating Group (ESTO-CG).

**STI Centres involved in technology assessment**

- Cellule Interfacultaire de Technology Assessment (page 37)
• Department of Sciences, Philosophies, Societies (page 48)

• Department of Social Studies (page 80)

• International Centre for Science & High Technology (page 174)

• Group for Technology Studies (page 91)

• Groupe d’Etude et de Recherche sur la Science (page 112)

• Fraunhofer Institute for Systems and Innovation Research (page 129)

• Institute for Technology Assessment and Systems Analysis (page 133)

• Postgraduate Programme Renewable Energies (page 151)

• Centre for Technology and Society (page 161)

• Centre for Technology and Culture (page 233)

• TNO Centre for Technology and Policy Studies (page 196)
4.4 KNOWLEDGE GENERATION

- Research Unit on Science and Technology Policy (page 255)
- Institute for Prospective Technological Studies (page 260)
- Department of Technology and Social Change (page 284)
- Centre for Social Theory and Technology (page 345)
- PREST (page 384)
- Centre for S&T Potential and Science History Studies (page 437)
- STV (page 57)
- VITO (page 63)

4.4.4 A new mode of knowledge production?

At present, we are witnessing profound transformations in the way scientific knowledge is being produced. The positions of the universities has undergone important changes, whereas new, non-traditional actors have entered the stage as knowledge creators. This is an important domain of studies in European science, technology and innovation studies. It has been proposed by researchers at SPRU, in Sussex, and by researchers on the
continent, that a transition is taking place to a new "mode of knowledge production" in which the game is played according to novel rules. This hypothesis is being tested in various types of studies. In the discussion, the question is also raised to what extent these changes are desirable. If it is true that commercial firms and for-profit research centres play a greater role in science, do we not run the risk of an all-out commercialisation of academic life? And what are the consequences for those who do not have access to vast budgets to dispense on relevant research?

The BESST project at SPRU tries to gauge the extent of change in the scientific system with bibliometric means, by which the production of scientific literature is being quantitatively measured. The research team developed a database of UK scientific publications back to 1981. This has enabled them to analyse in detail which trends emerged in the production of papers and journal articles. By analysing the addresses of authors, they were able to locate the sectors in which scientific knowledge is created and to find out who is doing what in which fields of science. The results were in many ways revealing.

Scientists co-operate much more intensely than they did in the past. In almost all sectors, collaborative papers outnumber non-collaborative and the differential is increasing. University researchers are the favoured partners, particularly in the physical sciences and engineering. Assuming such linkages can be taken as indicators of informal networks through which knowl-
edge and information are passed, it indicates that these informal networks are becoming relatively more important.

Companies, including small and medium-sized ones, publish papers over a wide range of sectors. Not surprisingly given its investment in the life sciences, the pharmaceutical and chemical sectors dominate, with the new biotechnology firms bringing the small and medium sized companies to prominence.

More surprising was the extent of publication by middle-ranking sectors such as water and construction. During the period 1981-1994, there was a substantial expansion of publication in the health, chemical, communications and SMEs sectors, and a decline in atomic energy, electricity, and electronics. These changes would appear to be related to the rise in R&D expenditures on pharmaceuticals, the privatisation of the UK electricity industry and the decline in defense R&D. Industry publications are well cited - in the life sciences for example, industrial research is more highly cited than UK research generally - although there is quite a high percentage of uncited materials. Foreign firms publish a fair amount in the UK.

The BESST project had also interesting methodological implications. By combining traditional bibliometric approaches with desktop techniques and clever, small-scale programming, a step was taken in the direction of what the authors mentioned "desktop scientometrics".
CHAPTER 4. DESIGNING THE FUTURE

STI Centres studying changes in the research and innovation system

• Science Studies Centre (page 299)
• Institute for Philosophy and Social Studies of Science (page 24)
• Group for Technology Studies (page 91)
• Bureau d’Economie Théorique et Appliquée (page 95)
• Centre de Sociologie de l’Innovation (page 106)
• Centre of Science, Technology and Society (page 97)
• Groupe d’Etude et de Recherche sur la Science (page 112)
• International Institute for Applied Systems Analysis (page 28)
• Fraunhofer Institute for Systems and Innovation Research (page 129)
• Institute for Science and Technology Studies (page 136)
• Institut für Soziologie Munich (page 140)
• Center for Science and Technology Studies (page 186)
4.4 KNOWLEDGE GENERATION

- Maastricht Economic Research Institute on Innovation and Technology (page 189)
- Max Planck Institute for the Study of Societies (page 146)
- TNO Centre for Technology and Policy Studies (page 196)
- Science and Technology Dynamics (page 206)
- The Netherlands Graduate School of Science, Technology and Modern Culture (page 210)
- Centre for Science Research and Statistics (page 245)
- Centre for Scientific Information and Documentation (page 251)
- Research Unit on Science and Technology Policy (page 255)
- Department of Technology and Social Change (page 284)
- PREST (page 384)
- Science and Technology Studies Unit Anglia (page 395)
- SPRU (page 403)
- Science Policy Support Group (page 412)
4.4.5 What have we learnt?

Helga Nowotny, professor in the philosophy of science and science studies at the ETH-Zentrum STW, at the polytechnical university in Zürich, Switzerland:

"STI studies taught us that there is no gap between science and society, but many interstices and overlaps. Science and technology are social and cultural practices - there is no science per se. There are institutions and spaces, like laboratories, there are instruments which are themselves the outgrowth of scientific and technical knowledge and there are practices and products that widely extend into society. Society is an enabling, and not a distorting influence on science and technology, as we have learned from comparative studies. Science and technology exert real social consequences and have unintended consequences - but at the same time, science as an institution is deeply transformed by its own success in changing society."

"We have learned from STI studies that societal context matters. Technical artefacts and technologies in general are used and shaped according to what people do with it and this varies with social context, cultural attitudes and practices. People make use of technology (and also scientific knowledge) in often unpredictable ways. They are not only passive consumers, nor docile recipients of whatever science and technology produce, but active agents who have expectations and who enter negotiations with science and technology systems and their
representatives on issues that concern them. These processes, which mark a shift in the political culture of the autonomy of science to its accountability, are likely to persist in the future. Even if the democratisation of science and technology is not without conflict, the increasing context-dependence of science and technology has to be translated into a heightened context-sensitivity of science and technology. The social sciences enter here: they have a major responsibility in informing science and technology how this can be achieved. We have to ensure that society will be brought more directly and indirectly into the core of scientific and technological activities."

"STI studies have incorporated many reflexive elements that have come to characterise a part of the social sciences and humanities. This has helped us to shed a naive empiricism and to abandon a crude positivism built on the erroneous assumption that the social sciences would be successful if only they succeeded in imitating the natural sciences. At times, this has also led to exaggerated claims of social constructivism, as though reality and social construction were mutually exclusive instead of constituting constraints upon and interacting elements of each other. Policy questions linked to issues of risk and uncertainty, expertise and policy-making, how to involve the public and to mediate conflicting interests have strongly marked the direction taken by a major part of STI studies."

"There is an increased awareness that science, while international in certain respects, is still performed and institution-
alised mainly in national research systems. STI studies bring out these aspects very clearly which find their correlates in other areas of European integration: how national systems interact with processes on a European and global level. Questions of the formation and reconstitution of social, cultural and national identities can profit from looking at the formation, stabilisation and widening of professional identities within scientific disciplines and scientific subcultures. But perhaps the most important contribution of STI studies to the process of European integration consists in insights that have been gained on how scientific and technological innovation depend on social innovation and vice versa.”

STI Centres studying theoretical issues in STI

- Institute for Philosophy and Social Studies of Science (page 24)
- Science Studies Centre (page 299)
- Centre of Science, Technology and Society (page 97)
- Department of Sciences, Philosophies, Societies (page 48)
- Department of Sociology and Social Policy (page 362)
- Department of Social Studies (page 80)
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- Bureau d’Economie Théorique et Appliquée (page 95)
- Centre for the Philosophy of the Natural and Social Sciences (page 318)
- Centre de Sociologie de l’Innovation (page 106)
- Groupe d’Etude et de Recherche sur la Science (page 112)
- Economics and sociology of R&D (page 122)
- Institut de Recherche sur les Fondements et les Enjeux des Sciences et des Techniques (page 127)
- Fraunhofer Institute for Systems and Innovation Research (page 129)
- Institute for Science and Technology Studies (page 136)
- Institut für Soziologie Munich (page 140)
- Department of History and Philosophy of Science (page 140)
- Istituto di Ricerca sulla Dinamica dei Sistemi Economici (page 176)
- Cultural and science studies (page 181)
• Maastricht Economic Research Institute on Innovation and Technology (page 189)

• Department of Technology and Society Studies (page 199)

• Science and Technology Dynamics (page 206)

• The Netherlands Graduate School of Science, Technology and Modern Culture (page 210)

• ESST University of Oslo (page 221)

• Centre for Technology and Society (page 235)

• Section of Science and Technology Studies (page 281)

• Centre for Research into Innovation, Culture and Technology (page 326)

• Centre for the Study of Science Policy (page 339)

• Centre for Social Theory and Technology (page 345)

• Centre for the History of Science, Technology and Medicine (page 309)

• Department of Philosophy and History of Science (page 167)
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- Department of Social Sciences, Loughborough University (page 378)
- London Centre for the History of Science, Medicine and Technology (page 372)
- Science and Technology Studies Unit Anglia (page 395)
- Science Studies, Edinburgh (page 398)
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- Wellcome Institute for the History of Medicine (page 430)
How this guide was produced

This guide is a first-timer. With over a hundred entries to STI centres and courses, we think it might be called a good start. Yet, we are acutely aware that because of this nature, there is more ground to be covered. We are almost certain that some institutions have been missed, whereas some included centres might like to have been presented slightly differently. Moreover, the fields of science, technology, and innovation studies are quite dynamic. Producing a guide like this is like shooting on a moving target. In this methodological note, we wish to account for the way we worked, in the hope this will inspire more STI centres to help update the information. After all, it is not the printed product that counts, but the process of guiding the public around in the maze of STI studies, as well as guiding the
studies around in the world at large.

The availability of a WWW-version makes this updating process a bit more than a promise for the next printed guide in a few years’ time. It might actually be done, depending on the institutional arrangements created by the STI centres themselves.

As will be clear, many people and STI centres have contributed to this guide. Thanks to them, it was possible to collect the information needed. It has been collected in a variety of ways.

First, a questionnaire was sent out to all addresses available at the time (we were aware that this list was inadequate, if only because this guide did not yet exist). As expected, the return rate was rather low. This is not only a general phenomenon of social surveys. It is also caused by the understaffing in many university centres, and the great amount of forms that have to be filled in on a routine basis. Understandably, the questionnaire more often than not ended up at the bottom of a growing in-tray. We therefore especially wish to thank the STI scholars who have nevertheless taken the trouble of painstakingly filling out the forms and providing additional documentation. This includes first of all the members of the advisory committee who have given more of their time than one would reasonably expect.

Second, a host of interviews with STI scholars have been held, with a two-fold aim: to collect background information
about the various activities in the field, and to include them in
the guide itself. Unexpectedly, the guide has become much big­
ger than expected. For this reason, we have been forced to drop
the plan to include the interviews themselves in the guide, as
much as we regret this ourselves. Nevertheless, they have been
especially valuable. A word of thanks therefore to all intervie­
wees.

Third, we have collected information about the STI centres
directly, by getting printed and on-line documentation about
their courses and activities. This has provided us with the bulk
of the information. Thanks therefore to all STI people who
have taken the trouble to update their homepages, and to write
accessible brochures and pamphlets describing their activities.

A word of caution in this time of accountable science may
be in order. This guide is not an evaluation or an assessment ex­
ercise and should not be used as such. We give the information
we have been able to collect as is. The choice does not entail
some form of peer review. As noted in the introduction to chap­
ter 3 (441), the selection of projects is only made with an eye to
learning by example. Many different projects might have been
chosen, and certainly will be chosen in the next version of the
guide.

We would like to conclude by saying that we hope the guide
will be used often, and that a revised version will be needed
sooner rather than later.
European Commission

Targeted socioeconomic research

EUR 18350 — The European guide to science, technology, and innovation studies

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