Introduction

The issues facing society today (sustainable development, health and industrial risks, new technologies, the knowledge society and so on) concern science and technology. Mad cow disease, the controversy over genetically modified organisms (GMOs), nanotechnologies, our understanding of climate change, the depletion of our natural resources, the fight against new epidemics (AIDS, bird flu and so on), and the transformation of our production systems are just some of the topics that concern the human and social sciences as well as the natural, health and engineering sciences. Researchers and lecturers in these fields are making sure that students receive thorough training in these sciences (covering the state of knowledge, methods, epistemology and so on), but also on the interrelations between ‘science and society’. Indeed, these are an essential key to the dynamics of science.

In science and engineering faculties just about everywhere, social science training courses have been introduced. Sometimes, the temptation is to believe that a dash of epistemology will be enough to get across to young scientists exactly what science in action is all about. Others believe that a dose of ethics is what they need to be able to deal with society-related problems. Of course, such beliefs are by and large illusory. Obviously, some kind of philosophical training has its worth, but what our young experts also need is scientific training that will allow them to get to grips with the real socioscientific dynamics. They need to be able to understand the dynamics behind the creation of knowledge and innovation, but they also need to be able to act on these, both as professional actors and as responsible citizens.

This book provides analysis frameworks to help students and scholars to decode the stakes underlying and surrounding science and technology. It looks at different ways in which science and society interrelate (for example, the emergence of scientific disciplines, the dynamics behind innovation, technical democracy and so on), and at the main social mechanisms that drive and sustain science (institutions, organisations, exchanges between researchers, building of content, concrete practices and so on). With this manual, sociology lecturers will be able to meet the rising demands of our colleagues working in the natural and engineering sciences. Its use is also recommended for new training courses such as a Masters degree in science and technology. But it will also help to prepare future generations of sociologists to deal with the science and society questions that many have tended to leave to one side.

The objective of this manual is to provide a broad range of analysis grids, concepts, methods and various other pointers about authors, schools of thought and the underlying debates. Readers of the manual will be able to understand and
use Robert Merton’s contribution to the institution of science and Bruno Latour’s with respect to the construction of sociotechnical networks. Decoding the workings of scientific job markets sheds just as much light on science as examining the material-related and cognitive culture of a laboratory. Similarly, studying the role of language interactions in science in the making, or in scientific publishing practices or in the interactions between scientists and non-specialists, are all starting points for analysis that go beyond the contributions of epistemology or ethics. This manual does not aim to be erudite. Nor does it aim to set up or defend one overriding theory of science, based on rationalistic epistemology, relativism, constructivism, relationism, neo-institutionalism or whatever. On the contrary, it studies and documents the various processes and mechanisms at work, as these are highly useful when trying to understand the dynamics in action.

It is a question of understanding what ‘doing science’ really means. Simply detailing the state of knowledge, as is usually the case in teaching and TV programmes popularising science, is not enough to understand how such knowledge was created. A student’s view of science based on what they learn from their lessons very often has little in common with science as it is practised. Even practical exercises rarely allow students to get a real grasp on research approaches. Students aiming to go into research discover the real face of science as they go along, as well as what they need to know to become a good researcher: methods, negotiating with colleagues, empirical know-how, science institutions and networks, writing styles and so on. History, philosophy, sociology, economics and linguistics all propose their own analyses. This manual has thus been written for future researchers too.

Any philosophical discourse that conveys one general and universal conception of science, as if it were the norm to be followed by all researchers, is counterproductive. On the one hand, it shrouds science in a mystery that is far from being compatible with actual scientific practices. Such discourse is therefore not very useful when it comes to providing researchers with concrete guidance in their work. Although it may stimulate thinking about science, and change the course of science, it is above all the privilege of those who have already proven their worth and can afford to wax philosophical about it. On the other hand, this general conception of science, which is pushed to the front when combating pseudo-science and irrationalism, is so far removed from concrete scientific practices that it loses all credibility. Without a philosophical representation that comes close to what can actually be observed or practised, reflexive researchers or outside observers are likely to fall into the worst type of relativism: ‘if there is no universal science then it’s all very much of a muchness’. The sociology of science, on the contrary, puts forward realistic analyses of scientific activity.

While some lecturers are afraid that the sociology of science is going to scare away their students because of the less edifying image of science that it portrays, others recommend that young researchers study it. Owing to its realistic approach, these students will become better researchers able to understand and act within the scientific world. This manual may lead some students to drop the idealistic views that had led them to pursue a career in science, while it will spark
INTRODUCTION

others’ passion for research and the way it works. It will help the latter to adopt a more lucid approach: science and technology pose problems of an ethical, political, economic and social nature. Neither the mystifying myth of rationalism nor radical and sceptical relativism are likely to help solve these.

As well as providing scientific and sociological training, this book is for anybody interested in the knowledge society: the growing scientific controversy and the issue of expertise are prime examples of this public concern. The book outlines a series of approaches designed to shed light on the relationship between science and society.

The Turns Taken by the Sociology of Science

This manual describes different ways of studying science, but it is neither a history of ideas nor a sociological work on the sociology of science. The relationship between, for example, sociological analyses and the social engagement of their authors will only be touched on in passing.¹ Taking the sociology of science as a subject of sociological study² will be for another project. This kind of analysis, based on the health economy in Great Britain for example (Ashmore et al., 1989), shows how interesting it is to report on the building of research programmes, the involvement of researchers in the media, the development of instruments designed for action and the insertion of young people in society’s institutions.

Approaches in the sociology of science have become increasingly diversified. The development of this field is based on ongoing dialogue with other social science disciplines. Philosophers have pondered over the nature of this great development over the last centuries. They have attempted to explain it by examining scientific reasoning and the intrinsic normativity of science. Historians have traced the evolution of ideas and instruments. Economists have explored the links between science and economic dynamics. The analyses performed by these various disciplines compete and contrast with each other. There are also academic quarrels within disciplines: in the philosophy of science (rationalism versus realism), psychology (different cognitive theories), economics (the neoclassical versus the evolutionist approach) and history (the inside history of ideas versus the social history of science). Furthermore, several developments in the sociology of science can only be understood by referring to the philosophy of science or to exchanges with the economics of innovation.

Nor is there any consensus as to the best way of going about the sociology of science. The diversity of approaches helps to enliven and enrich scientific production in the field. Several authors have published articles or works on its so-called ‘turns’: ‘social turn’, ‘cognitive turn’ (Fuller et al., 1989), ‘semiotic turn’ (Lenoir, 1994), ‘the turn to technology’ (Woolgar, 1991), ‘the practice turn’ (Schatzki et al., 2000) or ‘One more turn after the social turn’ (Latour, 1996) or Pinch’s pointed criticism (1993) at the thinker Woolgar: ‘Turn, turn, and turn again: The Woolgar formula’. One might also talk about the ‘normative turn’, in reference to the growing number of committees focusing on ethics and fighting scientific fraud.
Using the idea of a turning point is often rhetorical. The aim is either to speak out about an approach that has gone adrift or back in time (rationalist or cognitivist theories, sociological reductionism or the impasse of reflexivity), or to convince people that a major change has occurred (semiotic turn, pragmatic turn and so on). Different periods have seen different movements emerging. However, the main schools behind the structuring of the field are still active. They refer to the following representations of science:

- **Science as a social institution producing rational knowledge**: science is different from the rest of society. Its actors are scientists, critical producers of true statements, whose behaviour is governed by norms and the goal of their institution: ever-progressing knowledge.

- **Science as an exchange system**: scientific activity is geared towards nature for some and society for others. The actors are rivals, driven by the promise of rewards, by the build-up of credit or credibility or by the position that they can attain. They become rational thanks to the exchange system and the fierceness of competition.

- **Science as a reflection of local cultures and societies**: scientific activity and output are explained by social factors. Scientific activity is guided by the interests of scientists and the social groups to which they belong. The goals of science are imposed from outside. The stability of knowledge comes from the production of local social consensus.

- **Science as a set of contingent sociotechnical practices**: scientific work is linked to multiple elements (incorporated tacit knowledge, instruments, materials and so on) and results in various types of output and notably publications. The actors work in laboratories and keep up relations with society. Scientific dynamics depend on circumstances and local cognitive and material culture.

- **Science as a construction of distributed research collectives and sociotechnical networks**: scientific work consists in linking heterogeneous elements in order to produce robust entities (instruments, statements and so on). Alignment and reconfiguration mechanisms are central; they lead to relatively dense and wide-reaching actor-networks where the classic distinctions between nature and society do not apply.

The sociology of science generally switches from a study where the social aspect is seen as the central concept around which explanations are organised to other approaches where social causality is overridden by the focus on the material nature of things. The notion of science, viewed as a distinct entity, is rethought as a heterogeneous and distributed whole. Thus, the sociology of science has evolved from a sociology of scientists to a sociology of scientific knowledge, to social studies in science and technology and to an anthropology of science, technology and society.

These different analytical stances lead us to some relatively local approaches to scientific activity. Nevertheless, any globalising thinking about the relationship
between science and society is rare. The sociology of science rarely raises this kind of question at the macroscopic level, even if there are calls for sociology to shed itself of some of its positivism (dissection of scientific work) in order to put forward new landscapes re-injecting new meaning into all this activity and making it possible to assess it.

Notes

1 Merton’s defence of the autonomy of science in a period when the world was full of totalitarian regimes or the relativist sociologists’ fight against the hegemony of physics.

2 Little work has been devoted to the sociology of the social sciences, with the exception of Deutsch et al. (1986) and Halliday and Janowitz (1992), who show that the divides between specialities are much deeper than the barriers between disciplines. There have been few efforts to draw up any theoretical summaries.

Recommended Reading


References


