SOCIAL SCIENCES, SCIENCE POLICY STUDIES, SCIENCE POLICY-MAKING

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Summary

The article investigates some dimensions of the field of science-policy studies and the relation between science policy-making and the social sciences. It tries to understand some common pitfalls in the use of social sciences in policy-making: neither useless nor unique, the knowledge developed by the social sciences is going to affect the object it is concerned with. Social sciences can help to clarify issues by collecting data, describing phenomena and throwing new light on problems, assess the validity of choices and the feasibility of objectives proposed and also evaluate, in retrospect, the degree to which objectives have been attained. They will point out problems and question solutions, rather than propose recipes. The articles investigates how social sciences contributed to science policy on three large policy questions: the determination of the proportion of funding needed for research; the possibility of measuring the outputs of technological research and innovation; and the contribution of science and technology to the improvement of the developing countries' situation. Here are three examples of a chancy process – serendipity – by which science policy studies give rise to applications. The conclusions from these cases are explained as well as the possible agenda in order to have a more sound and intimate relation between science policy-making and the social sciences.

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1. Introduction

Since the 17th-century scientific revolution we have been accustomed to viewing the pursuit and advancement of knowledge not only as a speculative, but also as a useful endeavor in terms of its applicability. Knowledge is power, as Bacon said, because measuring, experimenting and demonstrating lead to practical applications. As

Descartes has emphasized, the whole process of searching was from then on oriented towards mastering, acting upon and changing phenomena: making men 'as it were the masters and possessors of nature'. The natural sciences have shown – all the more so since the industrial revolution and more recently since the growing association between science and technology – how much fundamental research contributes to the shaping and making of products and processes, tools, machines, technical systems and solutions which transform the functioning of societies and our day-to-day life.

This is neither a linear process nor one whose practical results can be evaluated through some kind of 'cost-benefit analysis' as a measurable function of the various scientific events that condition the genesis of technical innovations. As early as the 1960s, many studies have tried – in vain – to show that there is a mathematical relation between investments and scientific results. In fact, for any of the innovations considered by these studies, there is never a real contemporary starting point, since none of the event identified as 'important' could have occurred without the use of one or more of the great long-standing systemic theories. After all, space research and technologies go back to Copernic and Newton: 'old' science is always present at the root of new discoveries and innovations, and thus the real issue when one debates the utility of science is not the value, but the time of utilization – the duration of the delay before the returns on investments (whether intellectual or financial) become visible. Although such a process cannot be measured in terms of a mathematical relation, no one can doubt that technical innovation depends – and more and more nowadays – on fundamental research not only for its origin, but also for its continuous progress.

It is much easier in the case of the natural sciences to grasp the connection between the pursuit of knowledge and its practical results than in the case of the social sciences. This is, of course, one reason why the former are often defined – and appear – as 'hard' and the latter as 'soft' sciences. The deterministic pattern in which the natural sciences have accumulated their successes, even if this pattern has been challenged by many developments in theoretical physics, can never be paralleled in terms of the applicability with the social sciences. This can be illustrated by many examples in all kinds of disciplines. Science policy studies is a field of research that faces exactly the same limits and pitfalls, but also reaches the same possible practical results in relation to policy-making as any other field of the social sciences.

2. The Field of Science Policy Studies and its uses

This is a field which has grown enormously in a quarter of a century, and the torrent of literature on the subject is such that it is becoming almost impossible to keep abreast even with the bibliographies concerned with it. Nevertheless, it is still impossible to find an answer to the first problem confronting any new field of research – in this case where the boundaries of 'science policy studies' begin or end. This is not, however, simply a matter of academic hair-splitting. Many disciplines are relevant to the study of science and technology: history, economics, political science, sociology, psychology – not to mention philosophy and the natural sciences themselves. The broad scope and diversity of the field call for greater co-operation between the various disciplines which can provide understanding of what science and technology are about, and how they function in society.

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Not only are there necessary overlaps between the insights offered by several disciplines but, also, policy considerations will lead to research programs which transcend the fragmentations and regionalizations of the field. The degree of specialization is but a point of departure if one wants to understand the other elements that need to be taken into consideration in arriving at an approximation of the reality. Science and technology are neither the sole territory of scientists and engineers, nor the sole research empire of any social science. It amounts to a social sub-system that has a critical influence on social, economic and political change, and is in turn affected by these forces, so that there is a real need to build up perspectives which relate any one of these disciplines to the others.

On the one hand it is popularly believed – and often true – that policy-makers seek neat and tidy prescriptions from social science research. On the other, most social scientists claim – and often rightly – that their role is not to provide solutions to the problems with which administrations and policy-makers are faced. Does this mean that the gap between policy-oriented concerns and the research preoccupations of those who study science and technology is impossible to bridge? This question seems to me to be the epitome of a false problem. No one could doubt that the first aim of science policy studies is the production of knowledge, nor could there be any policy-makers so blind, or so obsessed by the need for quick results, as to believe that the very production of knowledge is useless or irrelevant until it has found an application.

Science policy studies have the same potential for utilization, as any other branch of the social sciences. If many research scientists are not primarily concerned by possible applications of their work, this in no way implies that their research is of less significance than that undertaken with a view to immediate applications. Conversely, policy-makers often pay little attention to the results of research: at best because they fear that research will only complicate the definition of their problems; and at worst, because they wish to use research results as a means of justifying or supporting decisions already taken.

Science policy studies are heir to all the ambiguities which affect relations between social scientists and policy-makers. And it is not the fault of scientists if many relevant data and analyses are in fact unused or not even referred to in the decision-making process; any more than it is the fault of policy-makers that the results of scientific work are so often presented in a form and language they do not understand or, even when they have grasped the essentials, do not see how they can be translated in terms of action.

There is, of course, an element which belongs to science policy studies as well as to other social sciences. In her introduction to the volume she edited with Derek de Solla Price under the aegis of the International Council for Science Policy Studies, Ina Spiegel-Rosing was right on the following point: ‘It is hard to conceive of knowledge production in this field as a pure research activity with no wider scientific community, no potential user, no public in mind. This is so, first of all, because much of the research on science and technology is publicly financed, sometimes directly, through research grants and sometimes indirectly, through the use of university facilities and teaching positions’. But the second point she underlined is not to my mind specific to science

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policy studies. Contrary to what she suggested, it is a general feature of any social science research and not something specific to science policy studies, that the knowledge produced is going to affect the object it is concerned with. This is indeed the very difference with the natural sciences. In the case of science policy studies, the knowledge produced is going to affect all aspects of science and technology, ranging from the criteria used to assess the progress of scientific research to the attitude and position taken by the scientific community towards the government and the public, and including as well the attitude taken by the government and the public toward the scientific community and endeavor. Thus, the production of knowledge in this field can hardly be distinguished from its impact upon the field itself, as it views itself and is viewed by the public at large.

It cannot be too strongly emphasized that the impact of policy studies is not a mechanistic process. Their influence is often indirect. They can help to clarify issues by collecting data, describing phenomena and throwing new light on problems, assess the validity of choices and the feasibility of objectives proposed and also evaluate, in retrospect, the degree to which objectives have been attained. They will however, more often than not, point out problems and question solutions, rather than propose recipes.

The criteria of coherence, and rationality, which are of course acknowledged to be features of any process by which decisions are arrived at, might be supposed to be particularly relevant to a field dealing with scientific activities. However, there is no evidence to be derived from experience, or from the avalanche of literature on the subject, that science policy is any more 'rational' than other policies. This, of course, should come as no surprise since policy-making is more often politics than not. The fact is that the theatre in which decisions are acted out, with its actors, director, stage manager and its comings-and-goings, does not cease to be political by virtue of the fact that its theme is science. This is a further reason for according another function to science policy studies; a function inherent in all social science research, and one which is not really welcomed by any administration. This is the critical function which questions accepted ideas, points out contradictions between the aims of a particular policy and the reality of its results, disperses the illusions and sometimes the mystifications of the assumptions that beset the conscious or unconscious practice of administrations.

Two conditions, however, need to be fulfilled on the part of both scientists and policy-makers. If scientists have a real concern to influence the decision-making process, they must make themselves more aware of the overall circumstances and conditions which will affect the applicability of their research results and, in consequence, venture outside the realm of their particular specialization in order to be able to appreciate the realities and constraints of the political and administrative world. Policy makers, for their part, should recognize that the decision-making process cannot take place in a closed system in which the legitimacy of the decisions taken is founded solely upon the experience, habits of thought and intuitive wisdom of the administration concerned, rather than through the instrumentality of the scientific approach which, with its methodological constraints, its questioning of accepted ideas, and the time required for reflection and analysis, is not easy to reconcile with bureaucratic or political imperatives. This, of course, is easier said than done. Nevertheless, this learning process of communication

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and the establishment of a common language is the prerequisite for the translation of any research in terms of application – and, hopefully, utilization.

The territory between social science knowledge that could be utilized and that which is actually utilized is, in fact, as hazardous as that in which lie the paths to scientific discovery. One can refer here to the model described by Robert K. Merton under the name of 'serendipity' to characterize scientific research as a voyage into the unknown by routes that are unpredictable and unplannable. The term was taken from the ancient name of the island of Ceylon – Serendip – about which Horace Walpole wrote a fairy-tale, *The Three Princes of Serendip*, in which the heroes 'were always making discoveries by accidents and sagacity of things they were not in quest of'. It seems to me that this same principle of 'serendipity' can be said to apply to the utilization of the results of social science research and therefore, in direct line, to those of science policy studies, in that, very often, what is used is not what one had set out to demonstrate or even considered to be utilizable. Here are three examples of this chancy process by which science policy studies give rise to applications which, to use the language of Walpole's fairy-tale, are not necessarily those 'they were in quest of'.

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Biographical Sketch

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