Introduction

The four major chapters and the two commentaries in this last part review the conceptual core issues and provide original insights into the rationale for funding of basic research seen as a public or quasi-public good. One of the characteristics of current approaches to public funding of research is the increased use of network funding. Both at the national and at the EU level, funds have been increasingly allocated to (a) collaborative research (research projects where individuals from different institutions are involved forming a network); and (b) networks of researchers to support knowledge exchange rather than research into the production of new knowledge. Several empirical studies have described these new funding/research structures, but little theoretical work to assess their impact and validity has been done. The first two chapters in this part (by Paul David and Louise Keely and Robin Cowan and Nicolas Jonard, Chapters 8 and 9) attempt to redress this. Both focus on networks though David and Keely’s work concentrates on the collaborative research configuration while Cowan and Jonard’s chapter focuses on the second configuration, that is, networking as a mechanism for knowledge exchange outside the local environment.

The other two chapters (by Peter Swann and Dominique Foray, Chapters 10 and 11) also focus on the fact that knowledge is characterized by strong complementarities in its production and use. However, they concentrate on another aspect of this characteristic: they analyse the possibility of collective production and use of scientific and technological knowledge. Specifically, Swann develops a theoretical framework within which to assess the applicability or otherwise of the club goods approach to funding basic research while Foray presents a review of the advantages and shortcomings of this approach in the case of industry-specific public goods.

Finally, the commentaries of Cristiano Antonelli and Bronwyn Hall provide a broader perspective on the issues discussed in these four chapters. Antonelli presents a critical discussion of the shift that occurred in the understanding of the process of knowledge production and distribution and its relation to public funding of scientific and technological knowledge. He stresses that current understanding of the importance of cumulability and complementarity of scientific and technological knowledge, both on the use and supply side, call for policy action in the area of governance. In his view, public funding of research is aimed not only at the creation of a
public good, but also, and mainly, at the management of dynamic coordination issues resulting from the instability of market interactions and multiple funding sources. Bronwyn Hall’s commentary highlights many of the key findings of the chapters in this part. She observes the important omission of the role of the university in diffusing knowledge through the education of graduates who carry with them to their industrial employment recent advances in knowledge. Hall also notes that the chapters underemphasize the potentials for using research collaborations to strengthen market power, to form cartels or to raise rivals’ costs.

David and Keely’s contribution starts from the observation that in recent years a small but growing body of scholarly work has provided useful qualitative and, to a lesser extent, statistical analysis of public resource allocation for collaborative research, but that no formal model assessing, for example, how research competences are affected by the allocation of funds based on network structure, has been developed. Thus, they set out to address this gap. They develop a formal model of coalition-building among research units that seeks competitive funding from both national and supra-national agencies. From this stylized model a set of challenging conclusions emanate, such as the fact that national funding decisions developed in response to the allocation of the supra-national agency do not constitute the optimal strategy. David and Keely offer strong analytical support to the view that, in a science-funding environment involving multiple sources, the assessment of policy action should be framed in a context of interdependence of multiple funding strategies and outcomes.

Cowan and Jonard’s chapter contributes to the analysis of the rationale for funding of basic research by examining the impact of networking upon the production and distribution of knowledge. Funding of networks both at the European and national levels has become important for universities at the expense of more traditional methods of funding research activities in single-institution settings. Cowan and Jonard’s chapter is an attempt to assess how much networking is ‘good’. They develop a model of knowledge creation and diffusion in which innovation in the knowledge stock (knowledge creation) is seen, mainly, as the recombination of existing ideas. They identify two main mechanisms of knowledge distribution and creation: collaboration via seminars or working papers (which gives rise to knowledge distribution and creation via recombination) and job mobility. The results of the simulation of their model point to the fact that too much networking decreases knowledge production; maintenance of only a few permanent long-distance links (such as those developed through networking) produces the optimal outcome.

The traditional justification for public funding of basic research focuses on the existence of positive externalities. Basic research is seen as a public
good which it is difficult to appropriate, hence the need for public funding to reach the socially optimal investment. The dissatisfaction with this approach in policy circles has been paralleled by an increased interest in the club goods approach to the funding of basic research. Swann’s chapter (Chapter 10) assesses the applicability or otherwise of the club goods approach to funding basic research. The analysis focuses on the ease with which externalities can be internalized within the club in relation to the applied versus basic character of research. If the benefits from research can be easily internalized (with low transaction costs) then club good solutions are preferable. The chapter identifies two specific factors affecting the rate of internalization: (a) the spatial distribution of beneficiaries and (b) the specific character of the diffusion process – that is, epidemic diffusion versus probit diffusion. When the benefits of research are spatially contiguous, with very few beneficiaries from other sectors or regions, that is to say, when a tight-knit socio-economic group benefits from the new knowledge, the club goods solution can be applied. This is more often the case for applied research than for basic research.

Chapter 10 concludes by highlighting a set of circumstances in which public finance of basic research is preferable to club good solutions that are attainable. It argues convincingly that in a world characterized by a large number of innovators (whose specializations are diverse) and a complex economy with substantial intersectoral science–technology relationships, public finance is preferable to a club good solution in most cases.

Foray’s chapter (Chapter 11) complements Chapter 10 by Swann. The focus in Foray’s work is to assess the feasibility of the provision of industry-specific public goods. The assumption here is that the public good is industry specific and, as such, it is possible to internalize the externalities to the club participants, who are a subset of the industry members. Thus, the chapter reviews empirical and theoretical evidence on the feasibility, advantages and shortcomings of club good approaches to the support of industry-specific goods. On the basis of a set of ‘real world’ examples – both historical and contemporary – Foray develops a matrix to evaluate the advantages and shortcomings of different provision of industry-specific public goods.

Collectively, the chapters in this part provide important insights into the mechanisms influencing the performance of research networks and collaborative structures. They indicate the possibility of new arrangements in funding and conducting research. However, rather than producing a panacea for the problems involved in governing the science, these mechanisms bring with them new and distinct problems of governance. They also introduce trade-offs and complementarities that are often not immediately apparent from the stated intentions of new programmes or funding mechanisms.
Ignoring the new issues of governance and the trade-offs and complementarities that these programmes may introduce is sure to result in unintended effects, some of which may contravene the original intent of the programmes’ sponsor. While this is very good news for researchers, providing ample opportunities for future study, it may not be as welcome either to scientists or to their sponsors.