INTRODUCTION

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In this volume we discuss theory, evidence, and policy perspectives concerning the use of public technology procurement as an instrument of innovation policy. Public technology procurement (as defined in Chapter 1, part 1), occurs when a public agency places an order for a product or system that does not yet exist, requiring technological innovation for the order to be met.

The most extensive part (Part II) of this volume presents empirical material, in the form of nine case studies. These studies document important instances of success and failure in public technology procurement in various countries. The remainder of the book (Parts I and III) considers theoretical, analytical, and policy questions.

The opening part (Part I) of the book provides a review of theoretical and policy issues related to public technology procurement. The initial chapter devotes considerable attention to definitional questions. It also relates a broad theoretical and conceptual framework to problems that are of specific relevance to policy development.

The central part (Part II) of the book contains our collection of empirical case studies. An Overview of the case studies is provided at the beginning of Part II. In addition to briefly summarising the cases, the Overview discusses our rationale for the selection of cases and addresses the matter of making valid analytical generalisations from a 'purposive sample' of cases.

The closing part (Part III) of the book returns to questions raised at the outset. First, it presents findings and conclusions drawn from a comparative analysis of the empirical case studies. It then outlines policy implications developed on this basis. In what follows, we will briefly foreshadow the policy issues that will be addressed.

1. SYSTEMS OF INNOVATION: A DEMAND-SIDE APPROACH

Our work builds upon a particular theoretical perspective – the so-called 'systems of innovation approach' (Edquist, 1997). The authors represented in this book have all used variants of this approach in their contributions to the description, analysis, and understanding of public technology procurement. Our work is also motivated by eminently practical concerns, which are emphasised in systems approaches to the study of innovation. In particular, we hope to redress an imbalance in current innovation policy-making.

Recently, there has been an over-riding concern with the development of 'supply-side' policies and a general neglect of the 'demand-side'. The demand-side, we contend, is of vital importance to the development of innovations and innovative economies (Edquist & Hommen, 1999). The examination and evaluation of public technology procurement – one of the main demand-side instruments available to innovation policy – provides a natural focus for developing this argument.

Although we proceed from a common theoretical standpoint, the findings and conclusions that we will present at a later point, together with the policy implications that flow from them, depend upon the analysis of empirical data. This takes the form of the aforementioned case studies of public technology procurement, which are presented in Part II of this book. Our analytical framework and strategy are discussed in Part III, at the beginning of Chapter 11.

In the remainder of our introductory remarks we will outline some of the ideas and debates addressed in this book. We will relate the study and practice of public technology procurement to general theoretical, conceptual, and policy issues that are elaborated more fully in Chapter 1.

2. THEORETICAL, CONCEPTUAL, AND POLICY ISSUES

Our analysis of the case studies (in Chapter 11) involves the concepts of 'developmental' and 'adaptive' public technology procurement (see Chapter 1, section 2.2). 'Developmental' public technology procurement means that (completely) new products or systems are created.[1] In 'adaptive' public technology procurement, the product or system procured is not new to the world but still new to the country of procurement. It must still be adapted to specific 'local' conditions, and this involves innovation.[2]

The purpose of these and other terms used in our work is to identify elements and modes of interaction related to innovation in the public technology procurement process (not applicable in regular, non-innovative, public procurement, i.e., the public purchasing of standard products "off the shelf"). These categories are used to suggest new patterns of policy making based on concepts that go beyond auction theory. As we explain more fully in Chapter 1 (section 1.4), auction theory is the 'conventional wisdom' drawn from standard economic theory that normally informs the regulation of public procurement processes.

2.1 Direct and Indirect Innovation Policy

Two modes of innovation policy action become relevant for our purposes: indirect and direct policies.[3] Indirect policies are those "which are closely related to the public in-

[1] This could also be called 'creation-oriented' public technology procurement.

[2] This could also be called 'diffusion-oriented' or 'absorption-oriented' public technology procurement.

[3] *Innovation policy* includes all public activities which influence innovation. These involve elements of R&D policy, education policy, infrastructure policy, regional policy and industrial policy.

fluence on ... framework conditions", including the institutional context, of innovation processes (Edquist et al., 1998: 43). Direct policies are initiatives or interventions in the creation or development of new technology "where a public organisation is directly involved in the interaction" (Edquist et al., 1998: 43). In public technology procurement these two kinds of policy action should ideally complement and be co-ordinated with one another. In practice, however, they might become opposed to one another. For example, a public agency might take the direct measure of procuring a particular technology and succeed in meeting its immediate goals with respect to satisfying social needs. At the same time, however, such an initiative might fail to develop national capacities for innovation in this technology, thereby forfeiting the competitive advantage that might have been gained through the procurement. This might, for instance, occur where the public procurement of new technology is not combined and co-ordinated with more 'indirect' policies that would aid the formation of innovation networks and the growth of competent firms by "supporting the knowledge-generating process in public research organisations and universities" (Edquist et al., 1998: 44).

In this book, we focus on an emergent conflict between the direct public technology procurement practices of individual countries and indirect policies affecting the institutional framework within which such procurement is carried out, i.e., the creation of public procurement rules by the EU. In the case of the European Union, the latter kind of policy has been framed and introduced at a supra-national level, although it has subsequently been implemented at the national level of individual member states. In the EU procurement regime – the rules governing public procurement in general – public technology procurement in the member states has been associated, at least implicitly, with protectionist industrial policies. This is the basis of the potential conflict to which we refer.

The EU policy perspective has concentrated almost exclusively on indirect measures that will create more *competition*. In contrast, we focus on public technology procurement as a means of building or enhancing capacities for *innovation*, thereby making firms and nations more *competitive*. Thus, we contradict the current orthodoxy which identifies any attempt to use public procurement as an ipso facto leverage for protectionism affecting optimal allocation of resources. Within the EU such attempts are considered as threatening the Single Market.

2.2 Competition Rules

Public procurement has been widely used as an industrial policy instrument in the past. This practice found some of its earliest justifications in the 'infant industry' arguments of List in the 19th century in Germany (List, 1904). The practice of public *technology* procurement was developed substantially in the 20th century. Like 'regular' public procurement, it was particularly relied upon when combined with infant industry arguments. It was also especially prevalent where the public sector was the sole or lead user and when substantial growth in international demand or spillovers were anticipated. This has led M. Best (Best & Forrant, 1996) to consider the public technology procurement of the US Department of Defence as the basis of American industrial policy.

In contrast, most industrial policies in the EU in the 1980s involved a protection in public procurement of, for example, the electronics industries. But all these policies of EU member states during the neo-protectionist period of the oil crises were dictated by the need to create national champions. Technological considerations were indirect and secondary, and this policy often proved disastrous for the countries and companies it was trying to protect (Pitelis, 1994).

This kind of industrial policy, widely attacked in the Cecchini Report (WS Atkins Management Consultants & Associates, 1988), triggered a negative perception of policies for public procurement. This, in turn, has led to suspicion (if not outright rejection) of any public procurement conducted on a 'non-auction' basis, regardless of the target and the nature of the procurement.

2.3 Deciding under Uncertainty: A Case for New Rules

Our purpose in this volume is to reposition the idea of public technology procurement in relation to innovation policy. We seek to separate public technology procurement policies from earlier industrial policy connotations. We also view the element of competition in a dynamic rather than static perspective. Competition rules are clear for existing products and may also be clear when asymmetric information is concerned. But here we deal with *procurement under uncertainty*.

In theory, awards of public technology procurement contracts involve fairly clear and definite agreements about costs and functional specifications. In practice, however, the final price and quality parameters of new and innovative technologies are unknown at the moment the contract is awarded. This changes the rules of the game.

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