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Editorial

Innovations in European and US innovation policy☆

Innovation systems, as Edquist (1997) has noted, encompass the economic, social, political, organizational, and institutional elements that influence the development and diffusion of innovations. Among the world's multiple innovation systems, those found in Europe and the United States (US) are particularly complex, well established, and extensive, accounting collectively for a majority share of global research and development activities (National Science Board, 2000). By almost any standard, the European and American innovation systems can be regarded as highly productive. Although there are substantial variations by country and region, as well as inevitable concerns about the advancement of specific scientific and technological fields, overall these are systems that have created a prodigious amount of new knowledge and pioneered and commercialized successive waves of innovation.

As an integral part of their respective innovation systems, innovation policies in Europe and the US are correspondingly multifaceted, ingrained, and wide-ranging, including all state initiatives regarding science, education, research, technology development and industrial modernization, overlapping also with industrial, environmental, labor and social policies. Yet, notwithstanding the achievements of European and American innovation systems, innovation policy on each side of the Atlantic is tasked and challenged to continue to foster change, meet new goals, and promote improved, more traceable research, development, and innovation performance (see, for example, Branscomb and Keller, 1998; Caracostas and Muldur, 1998). European and American researchers and companies are under heightened global competitive pressure to focus research towards commercial applications. Institutions are charged with forging new relationships between research and technology sponsors, producers, and users. Regions seek fresh ways to harness innovation to promote enterprise and economic development. In short, there is a need for policy and institutional modernization and transformation to reorient innovation systems to match current and emerging socio-economic, scientific, technological, industrial and political developments and challenges. In most industrialized countries innovation policymakers are — in one way or the other — trying to "reform" traditional policy approaches (see overview by OECD, 2000).

The articles in this symposium issue probe and prod this process of innovation in innovation policy. Contributors to the symposium overview and critique the evolution of policy innovation frameworks at broad national and, in the European case, supra-national levels, as well as analyzing processes of change in particular thematic areas of innovation policy in European countries and the US. There remain, of course, important differences in underlying innovation systems, policy frameworks, and specific policies between Europe and the US, as well among individual European countries. What is interesting is that, despite these differences, there are correspondences in how innovation policy change is being conceptualized and implemented. First, it is apparent that the institutional locus of innovation policy is broadening in both Europe and the US. Once the realm of national governments, innovation policies are now increasingly

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promoted by non-governmental organizations, public-private partnerships, sub-national agencies, and — particularly in Europe — supra-national programs. This does not necessarily mean convergence: although everywhere there seems to be a greater emphasis on sub-national regional innovation policies, the rise of supra-national innovation policy in Europe has no direct counterpart in the US. But, in both Europe and the US, long-established national institutions of science and technology policy are prompted to better mesh their activities with organizations and partners that differ by scale, scope, and orientation.

Second, the targets of innovation policies are shifting. Emerging research fields that promise rapid economic benefits are now the ones that most readily attract support, overshadowing traditional fields of scientific inquiry with less obvious payoffs. Similarly, defense-related research faces downsizing and is required to pursue new objectives following the end of the Cold War, while environmental and medical research is tasked with meeting growing global climatic and public health challenges. Third, new models for innovation policy are being pursued — models that are typically iterative, catalytic and networked and which accelerate the growth and pace of innovation among multiple participants, including small as well as large companies. These new innovation policy models seek modifications not only to programs, but also framework conditions and institutions and are subject to greater accountability and evaluation.

However, while European and US innovation policies are in transition, old institutions and policies still exercise considerable influence. The need for change does not necessarily guarantee that it will occur. Many of today's European and American innovation policies operate in or through national-level institutions which still reflect cultures and missions that were dominant in science and technology policy at the time they were founded decades ago. Policies and institutions built on the Post-World War II interpretation of defense needs and on linear or top–down models of innovation remain remarkably persistent. For example, in his contribution to the symposium, John Alic argues that US science and technology policy has found it difficult to adapt to a Post-Cold War, post-industrial period. The US no longer faces a super power adversary, while information-based services have supplanted the role of conventional manufacturing in driving its economy. Alic argues that fresh "interpretative" approaches to innovation policy are needed, policies that better integrate conception and implementation, are less means-ends oriented and incorporate an emphasis on process. Where policy fails to adapt, wasted resources and missed opportunities result. Hans Klein's analysis of the role of the defense sector in US civilian technology policies for transportation shows that policy is driven as much by the needs and capabilities of defense-sector actors than by the actors in the civilian sectors themselves. In this case, promising civilian technology policies are severely weakened by their conception and implementation in what are increasingly anachronistic institutions.

In Europe, the appropriateness of current institutions and frameworks for innovation policy is also a concern. Since the 1980s, as Luke Georghiou discusses in his article, Europe has seen the rise of supra-national innovation policies, through such mechanisms as the European Union's Framework Programs, EUREKA, and European Cooperation in the field of Scientific and Technical Research (COST). These initiatives based policy on new rationales such as pre-competitive research and global competitiveness, with an emphasis on trans-national collaboration. However, Georghiou finds that the justification for multiple, but separate innovation policies and programs at the European level has been overtaken by changed circumstances. An even broader, but more integrated policy framework, built on the concept of an enlarged European research area is proposed. Yet, while agreeing that present European innovation policy frameworks are inadequate, other analysts raise additional, if not competing, policy development paths. As the European Union enlarges over the coming decade, Stefan Kuhlmann highlights the tensions that are likely to emerge between European political and innovation systems. A spectrum of alternative innovation policy scenarios is possible, says Kuhlmann, from a centralized European innovation policy arena, at one extreme, to a decentralized arena based on national or regional innovation systems, at the other extreme. Similarly, Edgar Grande, analyzing national-level policies in Germany, argues that traditional state mechanisms of science and technology are caught in a strategic dilemma because they lack the capacities to implement the kind of complex policies needed in today's environment. Grande sees the solution not in

a shift and standardization to the European level, but in the formation of decentralized institutions and policies better suited to regional needs and differences.

US analysts also look beyond traditional institutions to find new approaches. David Hart contends that regulatory policies outside the conventional instruments of science and technology policy need to be recognized as essential elements of contemporary national innovation policy. In particular, he calls our attention to the role of US antitrust regulation in shaping the technological trajectories as well as the commercial outcomes from research and development. Philip Shapira examines the US manufacturing extension partnership as an example of a new paradigm in technology policy. Its partnership approach, which spans both public-private and federal-state boundaries, marks a sharp departure from most other post-war S&T policies. Nonetheless, while the manufacturing extension partnership is regarded as a successful initiative, it too faces challenges to performance as a result of competition over objectives and the perseverance of long-held ideas and practices about government intervention and technology transfer.

One obvious conclusion to draw from these articles is that innovation in innovation policy, like almost any other form of innovation, is not easily accomplished: it usually requires significant investments of economic, social, and political capital; it will frequently encounter barriers and opposition from vested interests; and it is a risky process that does not always lead to desired outcomes. Despite these difficulties, efforts to modernize innovation institutions and policies continue — indeed, we seem to be in an era where such efforts are accelerating, even though success, if definable, often remains elusive. Why is this? To be sure, the returns (social as well as economic) that are presumed to accompany progress in improving innovation frameworks and policies present a powerful motivator. Equally, policymakers generally recognize that there are substantial downside costs to not stimulating change, not limited to the expense of maintaining outmoded institutions and policies, but also in broader terms of opportunities foregone. Yet, there is perhaps more to the story than this. Today, policymakers are more aware of innovation systems beyond their own, and thus, seek to match, if not better, the initiatives of others. Research and development in Europe and the US is increasingly intertwined mutually and with other countries, through trans-national strategic research alliances, corporate foreign affiliate R&D investments, the rapid sharing of research results through new communication technologies, and the international flow of scientists and engineers. On either side of the Atlantic, innovation policy can no longer be considered in purely domestic terms: efforts to transform innovation systems have to take account of international and global trends. At the same time, we are also in an era where innovation systems are themselves advancing rapidly and there is genuine uncertainty and debate about how policy instruments and measures should evolve. In this context, we should expect, as well as encourage, greater experimentation in innovation policy, leading to the addition of new innovation policy layers even as old ones persist. If such innovation in innovation policy is to be fruitful, it needs to be accompanied not only by a tolerance for risk and flexibility, but also by considered assessment, reflection and learning to discern what is valuable among the new and to help wean out what the ineffective among the old. While there is no single method to achieve this end, we do believe that such goals are advanced through discursive processes of evaluation, comparison and contrast. In this light, we hope that the articles presented in this symposium will promote debate and present guidance not only to innovation system stakeholders and analysts in the US and Europe, but also elsewhere.

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Philip Shapira[1], Hans Klein*
School of Public Policy
Georgia Institute of Technology
MC 0345, Atlanta, GA 30332-0345, USA

*Corresponding author. Tel.: +1-404-894-2258
fax: +1-404-894-0535

E-mail addresses: ps25@prism.gatech.edu (P. Shapira), hans.klein@pubpolicy.gatech.edu (H. Klein)
[1] Tel.: +1-404-894-7735; fax: +1-404-0535

Stefan Kuhlmann
Department of Technology Analysis and Innovation Strategies, Fraunhofer Institute for Systems and Innovation Research (ISI)
Breslauer Strasse 48, D-76139 Karlsruhe
Germany

E-mail address: stefan.kuhlmann@isi.fhg.de (S. Kuhlmann)
Tel.: +49-721-6809-170/4; fax: +49-721-6809-260