

# Rethinking U.S. Research and Innovation Policy

*Philip Shapira*

In a new book, *Investing in Innovation: Creating a Research and Innovation Policy that Works*, edited by L. Branscomb and J. Keller, prominent U.S. experts assess recent developments in U.S. science and technology policy. The U.S. science and technology policy community has focused widespread attention on the book, its associated project publications, and its recommendations. The book not only offers up-to-date insights into current thinking within the U.S. science and technology policy field, but also offers a foundation on which future policy initiatives are likely to be built. These principles include continuing public initiatives to foster private innovation, public support of basic technology research as well as basic science, and improved access to technology, especially for smaller firms.

In many ways, the scale, scope, and power of research and innovation in the U.S. remains unmatched. This is evident, for example, in the strength of U.S. research universities and in U.S. corporate leadership in high technology industries ranging from biotechnology and aerospace to software and communications. However, fragmented public decision-making about science and technology and deep disagreements about the respective roles of government and the private sector in commercializing technology limit the value obtained from massive federal investments in research and development (totaling about \$75 billion in 1998). Weaknesses in systematic long-term policy also result in a U.S. research and innovation system that is not as prepared as it could be to meet new challenges. The ending of the cold war has shattered the justification for huge military research expenditures, many big U.S. companies have cut corporate R&D, and the internationalization of research means that the U.S. cannot expect to dominate all major fields alone. Yet, increased global economic competition requires better innovation diffusion to bolster industrial competitiveness. There are also greater demands to address environmental problems and promote a healthy and well-educated population.

On entering office in 1993, the Clinton administration pledged to restructure American science and technology policy to strengthen U.S. capabilities in meeting current and future challenges to research and innovation (*Technology for America's Economic Growth*, 1993). Promises were made to

- reallocate federal funds from military to civilian research,
- promote collaborative relationships between research performers and industrial users,
- accelerate the development and deployment of new technologies, and
- integrate technology policy with a major economic reinvestment program in education and infrastructure.

A subsequent policy statement (*Science in the National Interest*, 1994) emphasized the importance of a strong science base and the need to prioritize scientific research funding to meet strategic goals.

How well have these promises been fulfilled? And, what broader lessons and insights can be gleaned from the Clinton administration's efforts to recast U.S. science and technology policy? These are the two central questions posed in a new book, *Investing in Innovation: Creating a Research and Innovation Policy that Works*. The editors are Lewis Branscomb, Professor at Harvard University and former Chief Scientist of IBM, and James Keller, Associate Director of the Harvard Information Infrastructure Project. In the book, Branscomb and Keller bring together a diverse, non-partisan group of national experts to probe the Clinton record and offer recommendations for improvements.

The book's history is important. In 1993, Branscomb edited an earlier collection *Empowering Technology: Implementing a U.S. Strategy*, in which science and technology policy experts presaged many of the issues and

policy options facing the incoming Clinton administration. There seemed to be an unprecedented opportunity to refocus U.S. science and technology policy. What was not predicted was the sudden transformation of the policy environment with the election of the 104<sup>th</sup> Congress in 1994, in which the **new Republican majority was concerned to restrict (rather than extend) the government's role in science and technology**. Branscomb and his colleagues initiated a new project to rebuild consensus. Experts, government officials, congressional representatives, and other stakeholders were convened to consider the issues raised by both proponents and opponents of the administration's science and technology initiatives. **Sponsored by the bipartisan Competitiveness Policy Council**, the project continued with follow-up meetings, working papers, and the publication of this new book.

The book itself contains **eighteen chapters**. Limitations of space mean that only some of the chapters can be discussed here. The book's first section considers the **changing environment for technology policy**.

- Branscomb and Richard Florida review the challenges to technology policy in a global economy.
- Michael Borrus and Jay Stowsky examine the links between technology policy and economic growth.
- Jane Fountain highlights the importance in innovation of institutional arrangements ("social capital"). This is a significant contribution: **a major aim of current U.S. policy is to strengthen collaborative technology linkages between private firms and public institutions**.

The second section of the book examines **specific technology policies and programs**.

- Chris Hill assesses the **Advanced Technology Program's** controversial \$1 billion public investment in nearly 300 privately led technology partnerships. Republican charges that this is an unnecessary corporate subsidy are overblown, says Hill. But he recommends more attention to national (rather than corporate) research goals, better state and regional links, and new steps to sponsor broader industry research consortia.

- Curiously, programs like the **Small Business Innovation Research Program** (examined by Scott Wallsten) that are much bigger and **not necessarily more effective have escaped congressional scrutiny**.
- Philip Shapira (author of this review) examines the challenges facing the **Manufacturing Extension Partnership**, notwithstanding its success in building a nationwide network to upgrade technologies and operations in small and mid-sized firms.
- Linda Cohen has a less positive judgement on the administration's **defense conversion initiatives**. Program logic was flawed, she suggests, in expecting major defense contractors to voluntarily participate in efforts to bring a more commercial orientation to the industry.
- Other chapters examine **technology transfer agreements**, the administration's difficulties in **environmental technology policy**, and its marginal concern with energy research and development policy.

The third section of the book focuses on **policy tools and institutions**.

- Daniel Roos and his colleagues discuss the **growth of industry consortia** in the U.S., such as the **Partnership for a New Generation of Vehicles** – judged to have successfully brought together major U.S. automotive manufacturers around long-term industry technological issues
- Other authors examine the challenges facing **research universities** as they become more tightly intertwined with industry priorities and needs, and **state government's role in the innovation process**.
- Brian Kahin considers the administration's much vaunted **National Information Infrastructure Initiative** - finding the effort too diffuse to be fully effective.
- David Hart **critiques the management of technology policy** by the White House, suggesting too much attention to detail and not enough on following through on broader policy changes. Better long-term policy-making capacity and a bit more policy entrepreneurship are recommended.

**Overall, the book's verdict on the administration's science and technology record is mixed.**

- The massive human capital and infrastructure investments originally promised by the administration – and to which it aimed to link its technology policies – never came about, as **concern to reduce the budget deficit assumed greater priority**.
- A few programs, including the National Science Foundation and the National Institutes of Health, have seen budget increases, but **overall public R&D investment has not changed much**.
- Efforts to promote **new models of technology partnership are viewed as useful and important**. But they have lacked the scale to make a major difference.

In the final chapter, Branscomb and Keller build on the individual contributions to offer **six principles to guide U.S policies for research and innovation**:

- encouraging private innovation, through continuing public-private collaboration,
- public support of basic technology research as well as basic science,
- better access to technology, especially for smaller firms,
- using all policy tools, not just R&D spending,
- improved international cooperation in research, and
- more effective technology policymaking.

U.S. public research investment in a **21<sup>st</sup> Century Research Fund** only partly addresses the concerns raised in the book – and congressional support for this concept has yet to be won. Meanwhile, U.S. technology policy objectives remain hotly contested. As these issues are debated and future U.S. science and technology policies are established, the assessments, recommendations and policy principles contained in this book are likely to be very influential.

Further information:

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Table of Contents and sample chapters at  
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– *Science in the National Interest*, Washington, DC: The White House, August 3, 1994.

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Selected US science and technology policy institutions:

– National Science and Technology Council

[http://www.whitehouse.gov/WH/EOP/OSTP/NSTC/html/NSTC\\_Home.html](http://www.whitehouse.gov/WH/EOP/OSTP/NSTC/html/NSTC_Home.html)

– U.S. House of Representatives, Committee on Science

<http://www.house.gov/science/>

– White House Office on Science and Technology Policy

[http://www.whitehouse.gov/WH/EOP/OSTP/html/OSTP\\_Home.html](http://www.whitehouse.gov/WH/EOP/OSTP/html/OSTP_Home.html)