

*Innovation and Commercialization of  
Emerging Technologies*

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# Foreword

**T**echnological innovation is essential to the future well-being of the United States. The ability of the nation to sustain economic growth, increase its standard of living, and improve human health and the environment depends, in many ways, on its success in developing and commercializing new products, processes, and services. The growing capabilities of competitors in Europe, Asia, and elsewhere around the world increasingly challenge the ability of U.S. firms to convert the nation's science and technology base into a competitive advantage. Such concerns have prompted much debate about the proper role of government in encouraging innovation and the commercialization of new technologies. To date, however, the debate has been hampered by an incomplete understanding of the ways in which firms develop and market new products, processes, and services and the barriers they must overcome in the process.

This background paper examines the complexities of innovation and commercialization in an attempt to demonstrate the linkages between science, technology, and innovation, and to highlight the growing importance of factors other than basic research in commercial success. As shown, innovation is a complicated process in which markets often stimulate development of new technologies and product or process development stimulates scientific and technical research. Many factors influence commercial success, including the nature and composition of markets; competition from older technologies; choices of design and implementation; the availability of financing, standards, and complementary assets or infrastructure; and the ability to link with strategic partners. Government exerts significant influence on the innovation process, both intentionally and unintentionally. Research conducted for government missions can benefit commercial industry; federal procurement can jump-start nascent industries; environmental regulations can create markets for new technical approaches; government-sponsored technology demonstrations can provide useful information about new products, processes, and services to both users and developers; and laws in the areas of tax, investment, intellectual property, and antitrust shape the environment in which firms compete for resources and market share.

This background paper was prepared in response to requests from the House Science Committee (formerly the Science, Space, and Technology Committee) and the Senate Commerce, Science, and Transportation Committee. Throughout the course of this study, OTA received valuable assistance from its advisory panel, contractors, and reviewers, who both provided information for the report and ensured its accuracy and balance. The background paper is, however, solely the responsibility of OTA.



**ROGER C. HERDMAN**  
Director

# Advisory Panel

**Avtar S. Oberai**

**Chairman**

Consultant

**Paul Brickmeier**

Vice President of Advanced

Development

SVG Lithography Systems, Inc.

**Linda A. Capuano**

Vice President

Conductus, Inc.

**Sidney C. Chao**

Hughes Environmental Systems,

Inc.

**Robert Cook-Deegan**

Director, Division of Behavioral

Sciences and Mental Disorders

Institute of Medicine

National Academy of Sciences

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Oppenheimer and Co.

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President

JMC Ventures

**Robert T. Fraley**

Group Vice President and General

Manager

New Products Division

Monsanto Co.

**Charles E. Harris**

Chairman and CEO

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**Maryellen R. Kelley**

Visiting Professor

Industrial Performance Center

Massachusetts Institute of

Technology

**Ken Kennedy**

Director

Center for Research in Parallel

Computation

Rice University

**William G. Morin**

Director, Technology Policy

National Association of

Manufacturers

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Xerox Corp.

**Walter H. Plosila**

Executive Director

North Carolina Alliance for

Competitive Technologies

**John T. Preston**

Director of Technology

Development

Massachusetts Institute of

Technology

**Michael A. Rappa**

Associate Professor

Sloan School of Management

Massachusetts Institute of

Technology

**Richard S. Rosenbloom**

David Sarnoff Professor of

Business Administration

Harvard Business School

**Maxine L. Savitz**

Garrett Processing Division

Allied-Signal Aerospace

**Louis Tornatzky**

Director, Southern Technology

Council

Southern Growth Policies Board

**Stephen Turner**

CEO/President

Oncor Inc.

**Les Vadasz**

Senior Vice President

Intel Corp.

**Note:** OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.

# Project Staff

**Peter D. Blair**

Assistant Director, OTA  
*Industry, Commerce, and  
International Security Division*

**Audrey B. Buyrn**

Program Director<sup>1</sup>  
*Industry, Technology, and  
Commerce Program*

**Andrew W. Wyckoff**

Program Director<sup>2</sup>  
*Industry, Telecommunications,  
and Commerce Program*

**Julie Fox Gorte**

Project Director<sup>3</sup>

**Robert C. Weissler**

Project Director<sup>4</sup>

**Jerry R. Sheehan**

Analyst

**Rodney Sobin**

Analyst

**Paul N. Doremus**

Analyst

**Paul D. Semenza**

Analyst

**David J. Eichberg**

Research Analyst

**Jean E. Smith**

Editor

**OTA REVIEWERS**

**James W. Curlin**

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**Greg Eyring**

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**Steve Plotkin**

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**Liz Emanuel**

Office Administrator

**Karry Fornshill**

Secretary

**Diane Jackson**

Administrative Secretary

**Karolyn St. Clair**

PC Specialist

**CONTRACTORS**

**Kevin D. Beaty**

Consultant

**Donn Forbes**

Consultant

Center for Global Change

University of Maryland

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<sup>1</sup>Until September 1994.

<sup>2</sup>Starting November 1994.

<sup>3</sup>Until April 1995.

<sup>4</sup>Deputy Project Director until April 1995.

# Reviewers

**Chris Aldridge**  
Technology Competitiveness Staff  
U. S. Department of Commerce

**F. Ronald Bailey**  
Consulting Professor  
Stanford University

**Lester A. Davis**  
Senior International Economist  
U.S. Department of Commerce

**David Kahaner**  
Director, Asian Technology  
Information Program  
National Institute for Standards  
and Technology

**Brian Kahin**  
Director, Information  
Infrastructure Project  
Harvard University

**Joshua Lerner**  
Assistant Professor of Business  
Administration  
Harvard University

**Alan Miller**  
Director, Center for Global  
Change  
University of Maryland

**Stephen M. Millett**  
Managing Principal  
Technology Management Group  
Battelle Memorial Institute

**Jeffrey Mohr**  
Chief Scientist  
Information Technology  
Solutions, Inc.

**Carl G. Murphy**  
Chief Scientist  
RCI, Ltd.

**Lawrence M. Rausch**  
National Science Foundation

**J. Richard Sherman**  
President  
RCI, Ltd.