



Government Scientific and Technical Information (STI) *Challenges and Opportunities*

Introduction

- The management of government scientific and technical information (STI) is an important part of the nation's investment in science and technology. The investment in STI programs across the federal government account for a relatively small share of agencies' overall budgets (or R&D expenditures), but as a return on investment it plays a critical role in unlocking the value of the information resulting from the nation's research and development enterprise.
- Effective identification, collection, organization, preservation and dissemination of STI can not only accelerate scientific discovery (thereby improving the returns from investments in S&T), but can also stimulate innovation that drives economic growth and job creation, improve public health and patient care, support emergency preparedness and response to disasters, facilitate changes in the educational process, and contribute to other important national initiatives. STI also provides a robust evidence base for sound policy making.
- To this end, efforts to improve the nation's science and technology system should include specific elements to strengthen the STI infrastructure in both the public and private sectors, including the organizations that support it.
- Similarly, efforts to advance the nation's information infrastructure should recognize the importance of improving the quantity, quality, and accessibility of STI, through efforts such as digitization, improved search and retrieval systems, mandatory public access to government-funded R&D results, development and maintenance of data standards, data curation, and other functions carried out by federal STI centers.

1. Build the Information Infrastructure and Create High Value Jobs.

As we think about rebuilding the nation's infrastructures, we should be sure to consider the kind of infrastructure that is needed in an information-based economy. According to the National Science Foundation Plan "NSF's Cyberinfrastructure Vision For 21st Century Discovery," the Cyber Infrastructure that supports scientific and technological advancement and technology innovation is composed of High Performance Computing; Data, Data Analysis and Visualization; Collaboratories, Observatories and Virtual Organizations; and Education and Workforce. The FY2000 federal investment in public sector information was estimated at \$14.9B. The commercial information sector that relies on this investment generated estimated annual sales of \$641B, employing 3.2 million people. ¹

¹ Commercial Exploitation of Europe's Public Sector Information; Final Report for the European Commission

- ✓ A government-wide examination of how the STI infrastructure can best contribute to rebuilding the national infrastructure while creating high value jobs should be undertaken. CENDI (www.cendi.gov) is an expert resource for this examination.
- ✓ Some new high value jobs will need to be dedicated to the emerging fields of data archiving and preservation, data science, and data curation. The Administration should support these developments. (This is highlighted in the Committee on Science report noted in Item 4.)
- ✓ Dedicate additional resources to digital data preservation as well as digitization of the historic scientific record.

2. Harness the potential of STI to Support Science, Technology, Engineering and Math (STEM)

Directorate General for the Information Society. Pira International, October 2000.

Education and the Implementation of the America Competes Act (ACA).

We know we must stay competitive in STEM education if we are to stay competitive in the world economy. The Academy report on “*Rising above the Gathering Storm*” raised the red flag for STEM education in the US. The ACA attempts to address some of the concerns of the report.

- ✓ Recognize the important role that the STI infrastructure plays in STEM education.
- ✓ Support America Competes Act implementation.
- ✓ Identify and encourage new roles for STI organizations to enable the positive transformation of education in America.
- ✓ Focus on educating information professionals in the specialized data management requirements and data uses among the STEM disciplines.

3. Promote Public Access to Government-funded R&D Results.

The taxpayers’ right to access the results of publicly funded R&D is basic to our democracy. New information technologies provide opportunities for improving public access to the results of federally funded research. For some agencies and particularly for some disciplines like medicine, there is strong user advocacy for public access. The technical requirements for accomplishing Public Access, though not trivial, are well understood. The National Library of Medicine (NLM), in its development of PubMed Central, has offered to make the software and its know-how available to other federal agencies and has already done so in the UK as a bilateral partnership initiative. NLM has also made progress in establishing standards relating to archival formats that relate to this work and could be extended as a cooperative interagency initiative.

- ✓ Except where constrained by national security interests, support, through law and/or regulation, mandatory public access policies and encourage interagency cooperation.

4. Strengthen the Role of the Office of Science and Technology Policy (OSTP) in the STI Infrastructure.

Given the importance of evidenced-based decision-making, OSTP should recognize the significant and positive impact that STI has in the advancement of

science and technology. OSTP does its work through staff and interagency coordinating groups under the National Science and Technology Council (NSTC). Over the past few years, there have been a few subcommittees and Interagency Working Groups (IWG) formed that address some aspects of STI. These efforts should be supported and enriched.

- ✓ Support the recently approved COS report “*Harnessing the Power of Digital Data for Science and Society*” and support the transition of the IWG on Digital Data to a full Subcommittee status as recommended in the report.
- ✓ Establish an STI portfolio in OSTP and focus on the important role played by STI organizations in the context of a very rapidly changing environment due to information technology. Focus on coordination of Information related activities across the NSTC structure.

5. Take a Broad Approach to Improve the Accessibility of Government Information

6.

Organizations responsible for STI dissemination and access within federal agencies have made positive commitments to and progress in using information technology to improve the accessibility of government information. Their experienced managers have embraced the goals of transparency, collaboration, and participation and have taken steps to make agency information more widely and effectively accessible to the public through electronic means. Making agency publications more readily available via search engines is just one approach that has been pursued by many agencies. But there are other approaches such as dedicated databases, information portals, and Web 2.0 technologies. All approach must be considered as technology constantly progresses in order to ensure that taxpayers receive the best return on their investments in information. As more Government agencies turn to Internet-based solutions, libraries are increasingly enlisted to provide computer/Internet access and assistance to the public to facilitate their interactions with Federal agencies. This being the case, the importance of libraries and the need for their continued support increases in importance.

- ✓ Provide federal information program managers with the ability to respond with the best tools and technologies to improve access to federal information resources; don’t focus too narrowly on a limited set of approaches.

- ✓ Support the role of libraries in making government information available to the public. Include in this efforts to increase the availability of government information support for the libraries of STI centers, Federal libraries that support the agencies, and Federal depository libraries that serve the public directly.

6. Support Government Accountability and Transparency and Effective Implementation of the e-Government Act.

The federal government has spent over \$4.2T dollars in R&D funding since 1954 and continues to spend over \$140B a year. Because science and technology affects all aspects of life and because of growing public interest in US R&D spending, there is pent-up demand for reliable information on what R&D is being funded throughout the federal government. To improve government transparency, legislation mandated the creation of a system where all government spending can be viewed on line at USASpending.gov. This system is oriented to showing flows of funding, rather than the content of R&D projects, especially as it relates to the federal R&D enterprise. Under the e-Government Act and predecessor initiatives, research-in-progress systems such as Radius have been developed, but none of these systems has been fully successful, and some have been very expensive.

- ✓ The CENDI approach of a federated network of agency databases, like that used in www.science.gov, might allow a workable system to be developed, but it cannot be done without agency buy-in and funding. If the Administration would like to pursue this approach to increasing the transparency of publicly financed R&D, a proposal could be made on developing a workable system.

7. Develop An Understanding of the New Dynamic Among All Levels of Government, Public, Academic, and Non-Profit Information Infrastructures.

With the rapid advance of information technology there is a new dynamic in information. Capabilities only dreamed of 10 years ago exist on hand-helds. New industries have spawned that have changed the way we work, the way we play and even the way we think. We have become more information literate and everyone “searches.” Google has become a verb. Computing is going into the cloud. With these changing dynamics, the

roles and relationships between the public and private sectors including industry and universities have changed.

- ✓ We need to develop a better understanding of this dynamic as we determine the resources that must go into building an information infrastructure for the future.
- ✓ Emulate, and adopt when possible, best practices from all sectors.
- ✓ Provide economic incentives to all sectors to invest in R&D and technology transfer in STI areas of major concern like long-term data migration, digitization, and massive data management and storage.

8. STI as an objective of International Diplomacy.

S&T is critical for development and for raising the standard of living in the world. The developing world’s R&D infrastructures are hungry for access to the US S&T knowledge base – and the US will increasingly benefit from access to STI from abroad. Many STI programs provide support for international relationships through the exchange of STI. With the US culture of open science, this is a win-win situation. The international portal www.WorldWideScience.org and the US contribution of www.science.gov are examples of the opportunities to partner internationally on the exchange of scientific information.

- ✓ Recognize and promote STI as a valuable tool in international diplomacy, with mutual benefits for the US and partner countries.
- ✓ Give science a place at the diplomatic table by using scientists in official ambassadorial roles and by providing access to STI subject matter experts throughout government.
- ✓ In international negotiations on intellectual property rights, ensure that the special needs of openness for STI are factored in.

9. Support Improved Health Care and Better Disaster Preparedness and Response Through the Development of an Interoperable Health Information Technology Infrastructure.

Improving health care is a major challenge in the US. Efforts to improve the quality and reduce the cost of health care can benefit from improved access to information about the comparative effectiveness of various treatments, including timely access to ongoing clinical trials and their results, and from the adoption of

electronic health records (EHR) that can store and communicate patient information in standardized forms. STI centers play important roles in collecting and organizing such information and in developing, maintaining, and disseminating standardized vocabularies and other standards that promote interoperability and the exchange of health information. They increasingly collect and make available information and related knowledge management tools that can assist in preparing for and responding to natural and man-made disasters.

- ✓ Ensure the active engagement of and necessary support for relevant STI centers in the development of an interoperable health information technology system.
- ✓ Promote cooperation among relevant STI centers and with private sector entities engaged in health informatics.

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