

**Information, Technology, and Governance:
A Grand Challenges Research Agenda Workshop**

Pre-Workshop Discussion Paper

Introduction

The institutions we call government make up a vast and complex mix of agencies and programs reaching from the neighborhood elementary school to outer space. Their needs for better information flows and more efficient technologies are just as vast and complex. Meeting these needs poses many daunting challenges for those in government and in the scientific and engineering communities. It's up to them to create the new technologies and ways of working that can break through the many technical and institutional barriers to innovation. Identifying the most daunting and important of those challenges can stimulate new research streams and encourage more effective collaborations among researchers and government practitioners. A challenge, such as creating a fully integrated real-time network for all public health related information across the US, could stimulate major research breakthroughs in health care, epidemiology, computing systems, and organizational innovation, among others. Similarly, new forms of sensor networks and analytical tools could allow monitoring and control of traffic in metropolitan areas to track and reduce emissions and wasteful stoppages. Many more of these grand challenges remain to be identified and pursued.

To take on such challenges we need new understanding of the way technical capabilities and social forces shape the workings of government. Advancing knowledge in this area is fundamentally important for transforming the practices of government and governance in contemporary society where a new paradigm is emerging centered on the interplay of information technology, individuals, organizations, and institutions. The intellectual merit and societal benefit of systematically uncovering and understanding these interdependencies cannot be overstated.

A bit more than a decade ago some of the nation's finest computer, information, and social scientists and government practitioners worked to design and build a digital government research program for the National Science Foundation (NSF). The efforts of these scholars and practitioners laid the foundation for a community that has grown in size and significance in terms of its ability to create new knowledge about the phenomenon of digital government and to translate that new knowledge into practice. Although discontinued after five years as planned at the outset, the program met its primary objective: new theories, practices, methodologies and curriculum have been developed and a community of practice has emerged with conferences, journals, and new professional associations.

The projects supported by the Digital Government Research Program at NSF ran a disciplinary gamut from computer science to social science oriented studies, with a majority focused on the more technical aspects of digital government. In recent years, NSF has begun to expand its scope to include more support for research focusing on socio-organizational contexts. Programs such as the Information Integration and Informatics Cluster in the Division of Information and Intelligent Systems (IIS), the Computer and Information Science and Engineering Directorate (CISE), and the Social, Behavioral and Economic Sciences Directorate (SBE) all provide examples of this expansion.

Advances in technology together with the significant role new technologies are playing in government and society demand a fresh consideration of a digital government research agenda and of the mechanisms in place to support it. The Digital Government Research Program enabled the creation of new knowledge about the phenomenon of digital government. However, we still need to push the boundaries of our understanding of the interplay of complexity, value, and risk in the emergence of new information technologies and their adoption by a range of individuals and institutions. To do this, we must revisit the digital government research agenda and the support mechanisms—whether new partnerships or new funding strategies—that must be leveraged or created to pursue that agenda.

**Digital Government Research Program:
Social Science-oriented Projects**

The Digital Government Program funded 201 projects; 37 of which were social science oriented. This set of projects produced 90 publications. Of the total publications (90), more than half concentrate on two major issues: e-democracy and cross-boundary collaboration. Other themes include local and community systems, legal issues, crisis management, and research methodologies.

Even the most profound technical breakthroughs are not sufficient to meet the grand challenges to government transformation. Such fundamental change depends in large part on policies, financial structures, organizational cultures, political interests, social ideologies, and the full range of institutional arrangements that make up the context of government. Understanding the interactions of context and technology is necessary. This requires the collaboration and partial integration of currently separate disciplinary research avenues from the outset, as well as new relationships between research and practice. The interdisciplinary and multi-sector nature of this work also contributes to its potential for broad impact, which ranges across the disciplines and throughout the institutions of government.

Research of this type is:

- 1) *Transformative in theory and in practice* – It redefines the paradigm of breakthrough technology-related research, and includes the analysis of context transformation.
- 2) *Necessary* – It looks ahead to anticipate and resolve challenges within socio-organizational contexts, such that the ultimate impact and consequences of technological breakthrough is more fully understood, and
- 3) *Consequential* – It evaluates and compares the initially assumed impact against the observable impact of the breakthrough to inform further research investments.

Workshop Background

Information, Technology, and Governance: A Grand Challenges Research Agenda is a project sponsored by the National Science Foundation to craft a multi-year research program to address the grand challenges of government and governance in an environment of rapidly evolving social and technical change.

The key event in the project is a workshop that will bring together leaders from social and information science research and government to explore these grand challenge questions and develop a next generation research agenda, with a particular focus on socio-organizational contexts.

The workshop builds on past work to lay out an agenda for digital government research, most notably two other NSF-sponsored workshops—one in 1997 and a second in 1998. The first, hosted by the Information Sciences Institute at the University of Southern California, produced a report entitled *Towards the Digital Government of the 21st Century: A Report from the Workshop on Research and Development Opportunities in Federal Information Services*. The second, hosted by the Center for Technology in Government at the University at Albany, State University of New York, produced a report entitled *Some Assembly Required: Building a Digital Government for the 21st Century*. Both reports laid out recommendations to guide the development of a Digital Government Research Program for the National Science Foundation.

Goals of the 2010 Workshop

The main goal of the 2010 workshop is to lay out a new research agenda that focuses on the interplay of complexity, value, and risk inherent in the emergence of new information technologies and their adoption by individuals, organizations, governments, and the civil and private sectors.

The workshop discussions will emphasize:

- Understanding the multiple contexts in which government and governance operate and how those contexts matter in technology adoption, use, and impact.
- Assessing lessons learned from previous research that provide insight into the technology-related behaviors of various actors and their consequences for government and governance.
- Leveraging the knowledge and expertise of the workshop participants about how value, risks, and complexity are understood and addressed by government decision-makers and managers.

Using an interactive and interdisciplinary approach, we will explore these topics in order to recommend research themes, designs, and funding criteria for future work that will have both scholarly and practical value.

Background Documents

TOWARDS THE DIGITAL GOVERNMENT OF THE 21ST CENTURY:

A Report from the Workshop on Research and Development Opportunities in Federal Information Services

Stolfo & Schorr, 1997

*This report recommends that the Federal Government invest
in a new applied research program to realize this vision.*

A partnership between government agencies and the information technologies research community has succeeded in the past for the benefit of the nation. The most notable example is the emergence of the Internet as the basis for broad scientific, cultural, civic, and commercial discourse, evolving from what was originally a government-supported networking research project. The collaborative development of a new applied research domain is critical to help meet the nation's growing information service demands. Applied research that considers real world operating constraints can provide valuable new problems and insights for the academic research domain, leading to new demonstrable and deployable systems. This applied research domain is a National Challenge to provide a transition strategy for migrating Federal Information Services from legacy systems, through the interoperable systems of the Internet, and toward more advanced integrated global systems. A unique opportunity exists for a new paradigm for interaction between Government and citizen; an opportunity to invent the digital government for the citizens of the 21st century. This report recommends that the federal government invest in a new applied research program to realize this vision.

http://www.dgsociety.org/library/1997_May_TOWARDS.pdf

SOME ASSEMBLY REQUIRED:

Building a Digital Government Research Program for the 21st Century

Dawes et. al 1998

What is technically possible may not be organizationally feasible or socially or politically desirable.

First, although academic research can have a significant influence on government practices, the government and research communities have very different value systems that need to be taken into account. Government is risk-averse by design, and research is quite the opposite. Government managers often need quick answers, while researchers tend to take a longer-term view. These differences need to be taken into account through the development of new models for informing and integrating practice and research.

Like government, research has its own disciplinary specialties that deepen and expand knowledge within each field. To meet the needs identified above, researchers not only must advance knowledge in individual fields, but must also find synergy across them. In particular, social and information scientists need to work together.

The intricate interdependencies of government programs require a holistic line of research that accounts for the interactions among levels of government and between the public and private sectors. Access to venues for this kind of research will require trusting long-term relationships between researchers and government managers, as well as substantial multi-year funding.

Finally, policy guidelines, organizational forms, and technology tools constantly interact with one another, generating many questions and conflicts about what is technically possible, organizationally feasible, and socially desirable. Research that focuses on the intersection of these domains is inherently multidisciplinary, complex, and difficult to design and manage, but essential to achieving the goals of digital government.

http://www.ctg.albany.edu/publications/reports/some_assembly/some_assembly.pdf

Profiling the EG Research Community and Its Core

Hans J. (Jochen) Scholl, 2009

[Leading scholars have] argued that EG as a domain of study has progressed beyond its stage of infancy and that EGR has produced a steady stream of no less than three hundred, English-language, peer-reviewed articles per annum ever since 2004. For a young domain of study, this is a remarkably high output volume. It was further found that roughly half of the annual research volume is published in so-called EG core journals (Scholl 2009).

An additional third of this annual output is published in the proceedings of one of three annual EG core conferences, that is, the Electronic Government Track at the Hawaii International Conference on System Sciences (HICSS), the dg.o conference organized by the Digital Government Society of North America (DGSNA), and the Europe-based DEXA/EGOV conference, each of which has been conducted for about a decade and has produced a sizable contribution to the academic knowledge in EGR (ibid).

Over five sixths of EGR, hence, is published in EGR core journals or proceedings of EGR core conferences. After the record year of 2005 with almost 500 peer-reviewed publications, EGR went through a short phase of declining publication numbers, until 2008, when an increase of some 17 percent to 368 EG publications was recorded. The topical breakdown showed that half of EG publications were dedicated to (1) *organization, management, and transformation*. With around ten percent each, four topics followed: (2) *digital democracy*, (3) *e-services*, (4) *design studies and tools*, and (5) *policy, governance, and law*. The topic of (6) *infrastructure, integration, and interoperability* ranks in sixth place with a little under seven percent followed by the two small topical areas of (7) *information security* and (8) *foundations and standard of inquiry* (ibid).

The analysis also uncovered that 85 percent of all EG publications were nontechnical in nature. Most publications were empirically based. Over 3,500 authors were recorded; however, more than three quarters of those authors had published only a single article or paper. In other words, around 800 individuals had published more than one article or paper on EG, suggesting that the core community of EG researchers, that is, individuals with at least one.

<http://www.springerlink.com/content/9716h49683q217w0/>