

3. Government needs for the 21st century

Government managers have critical needs for models and tools to shape, manage, and evaluate 21st century services. These needs present research opportunities for both information and social scientists, and can provide a venue for more active and useful interaction among research disciplines and between researchers and practitioners.

The October 1998 workshop discussions reflected the dimensions of government and the changing technological and organizational landscape. Working in small groups organized by level of government and research discipline, the government participants discussed the challenges they see in the years ahead and researchers debated the strengths and weaknesses of their current approaches. As a result, the participants produced a list of eight critical governmental needs which can be translated directly into research themes. These needs collectively comprise key questions of understanding, development, testing, evaluation, and dissemination of new knowledge about how government might operate in the digital age. The participants also reviewed the historical ways in which research and practice interact and discussed potential changes that would make this relationship more valuable than it is today. The results are discussed below and are illustrated in Table 2 by some of the potential research projects that were generated in a "marketplace of ideas" conducted at the end of the workshop.

Interoperable systems that are trusted and secure

Many information systems that support government services need to be both trusted and interoperable. Interoperable systems are ones in which several systems based in different organizations work smoothly together. Trusted systems have built-in security and authentication features that allow their users to assume a high level of safety and integrity. Such systems must deal effectively with several difficult issues that emanate directly from the complex and dynamic environment of public programs. First, system development methodologies are needed that deal well with the scope and diversity of users, customers, and stakeholders that are involved in government information systems. Second, research is needed to understand the potential for, and the limits of, integration across technological, organizational, and political dimensions. Third, because most government services are expected to be available in consistent form in every community, systems must operate with equal quality on both very large and very small scales.

Key research questions:

- What institutions, laws, and policies are needed to support interoperable government systems?
- How should the costs of interoperable systems be distributed among the participating organizations?
- What is the role of government in the development of standards?
- What tools and approaches work best for smaller governments and agencies?
- What are the technical, legal, policy, and management issues surrounding authentication in the public sector?

Models for electronic public service transactions and delivery systems

Currently in the U.S., approximately 90 percent of all government services are still delivered in a face-to-face mode. With the proliferation of the Internet among government agencies and citizens, it is now possible to offer new services, integrated services, and self-service in ways and places never before possible.

The ability to transact business or have an actual say in government in an electronic environment could bring the benefits of disintermediation, a more productive and less costly method of service and information delivery. The public could benefit from information and services that are directly accessible and available all the time, without the intervention of a public employee. Such service models, however, require new methods of authentication, recordkeeping, security, and access. They need to be supported by analyses of cost-effectiveness that take into account more than the costs and effects internal to the government. They need to recognize that not all citizens will be able or willing to interact with government in this new way, and that multiple points and methods of service will be required in many instances.

Key research questions:

- Who benefits from "one-stop" service models and how should those benefits be measured? Similarly, what are

3. Government needs for the 21st century

- the costs and who pays them?
- How can services be made available to those who can't or won't use electronic means?
- What are appropriate risk management methods for making the transition from traditional to electronic services?
- What criteria should determine whether value-added services should be provided by government or by the private sector?

Better methods of IT management

Every government IT manager is looking for ways to design and maintain more successful systems. Efficient design processes, tested and documented methods of project management, software development, and system upgrades and migrations are all needed. Practitioners want ways to build learning into the IT management process and to anticipate and plan for future technological capabilities. They seek leadership models and ways to bring and keep IT on the agenda of top executives and elected leaders. The cost of IT, and its distribution across different players, is a major concern. This issue covers a broad terrain, ranging from the costs of upgrading aging infrastructure for early adopters, to the costs of implementing systems that require participation, but do not cover the costs, of other organizations. Contract management and oversight of outsourced development and operations are becoming critically important, as is the need to deal with the shortage of IT skills in the labor market. IT managers also need ways to assess the applicability of private sector business models to government initiatives and ways to engage private companies in the operation of public service systems.

Key research questions:

- What improvements in design processes will lead to more successful systems?
- What are the common characteristics of successful government IT projects?
- How do and should practitioners identify and adopt "best practices?"
- What methods can government employ to better anticipate changes in the technology environment?
- How should resources be distributed between infrastructure and applications?
- What are the characteristics of effective outsourcing arrangements? What skills, techniques, and knowledge must government contract officers possess?
- What methods of enterprise planning work best in which environment?

Methods and measures of citizen participation

Internet technologies can facilitate a more direct interaction between citizens and government through the development of a digital democracy or electronic commons. The Internet and the World Wide Web make this a viable next step in our democracy. Casting one's vote on the Internet, attending Congressional hearings or City Council meetings via the Web, instant generation of public opinion polls, interactive candidate debates, and easy public access to government data are but a few of the potential outcomes. However, important questions about the effect of digital democracy abound: To what extent, and with what consequences, will this capacity enable greater involvement of citizens in their own governance? Will more or different kinds of citizen participation change the nature and role of political leadership and democratic institutions? Will instant expressions of personal and public opinion improve or degrade the quality of public discourse and formal policy deliberations?

Key research questions:

- What knowledge and technologies must citizens possess in order to participate in electronic governance?
- Does the existence of electronic means of communication improve citizen participation in democratic processes?
- What is the potential for intelligent agents and customized interfaces to change the way citizens participate in government?
- How must the processes of governance change to account for electronic participation?
- How does electronic participation affect citizen trust in government?

Models for public-private partnerships and other networked organizational forms

Given the diversity of players involved in delivering government services, the development of effective IT systems may require new coalitions of partners at all levels of government and between government and the private and nonprofit sectors. The complexity of the resulting organizational and technological relationships is daunting. Different public agencies operate under different, sometimes conflicting, authorizing statutes and appropriate funds through separate, but related processes. Federal, state, and local levels carry out different, but overlapping, constitutional purposes. There are considerable legal, economic, and ethical issues associated with private companies engaged in public programs. The technology architecture and infrastructure associated with networks of interdependent, but separate, organizations is not subject to the same planning, support, or financing methods that characterize more traditional organizational forms. Answers to these and other questions related to integration of functions and technologies are critically needed.

Key research questions:

- What are the conceptual and practical dimensions of "virtual agencies?"
- What are the characteristics of effective service delivery networks made up of multiple public organizations or mixtures of public and private organizations?
- How can public agencies leverage private sector innovations to improve services to the public?
- What are the limitations of private sector involvement in the delivery of public services?

Intuitive decision support tools for public officials

The advent of technologies and data standards that support and encourage information search, selection, analysis, and sharing may change the nature and effectiveness of executive decision making. Many kinds of public officials make decisions in a variety of settings under a wide array of conditions. Elected officials at the Federal, state, and local levels make policy decisions; appointed and career government professionals decide how to interpret policies in the context of program and agency operations. In some cases the decision process is very structured, in others it is more informal. The kind, amount, and timeliness of information available and the openness of the decision process are also strong influences on the decision-making process. These tools may also have implications for public participation and open government.

Key research questions:

- What tools are effective in integrating legacy databases to support policy deliberations and management decisions?
- What are the conditions for successful use of advanced simulation and modelling of social, technical, and physical systems?
- How do decision makers value these tools compared to other ways of deciding?
- What kinds of decisions need to be supported by technology and in what ways?
- What tools are best in situations of information overload? Information insufficiency? Variability in information quality?

Archiving and electronic records management frameworks and tools

With most information now created in electronic rather than physical form, issues such as record definition and content, version control, public access, and ongoing preservation affect the ability of government to function efficiently and maintain history and accountability. Government officials need to provide for long-term preservation and use of records in a technology environment that values and encourages rapid change and innovation. There are issues related to management and preservation of both single- and multi-media records. Questions about principles and methods of access by internal and external users, for both primary and secondary purposes, present a host of policy, management, and technology problems.

Key research questions:

- What is a public record?
- What technical infrastructure is needed to maintain a digital archive?
- How can deteriorating traditional records be cost- effectively transferred to long-lived media?
- For records worth long term preservation, when would a summary suffice and what would it contain?
- What tools will support intelligent scheduling, appraisal, and retention of digital records?
- How can we compare the cost of archiving to the value of the archived record?

Matching research resources to government needs

Applied research is not often rewarded by academic value systems. As a consequence, researchers often pursue theoretical research instead of field work. Government agencies often will not or cannot wait for the results of traditional research to affect their decisions. On the other hand, useful research findings often go unnoticed because the form and outlets in which they are disseminated are unknown or unattractive to practitioners. The most valuable forms of research must involve a variety of activities that lead to ideas that government can use directly. They also demand research relationships that benefit both researchers and practitioners.

Key research questions:

- What research-based products are used by, and useful to, government practitioners?
- What methodological innovations can speed the production of research results and the dissemination of useful knowledge?
- What are the characteristics of successful partnerships between government agencies and academic researchers?
- What institutional relationships between higher education and government lead to relevant and timely research for government use?
- What methods can researchers employ to better anticipate the future knowledge needs of government?

3. Government needs for the 21st century

Table 2. Preliminary Ideas for Digital Government Research Projects	
Assess the readiness of communities to engage in electronic citizenship	Explore the relationships among the design process, resource management, and knowledge management as components of IT management in government
Assess the integrity and integratability of data from a network of multiple sources to answer overarching questions about the social and economic effects of IT	Filters and agents for interacting with the White House online
Case studies of electronic public service models	Identify the characteristics of effective human service delivery networks
Clearinghouse of resources for the development of data standards	Improve courtroom production through use of IT workflow tools
Co-evolution of local government services and citizen involvement in service design	IT and the support of civil society: helping voluntary organizations complement the work of government
Comparison of several structured forums for electronic democracy	National virtual clearinghouse for government research needs
Coordinated collection, analysis, and integration of community intelligence in government IT development	National virtual clearinghouse for IT research relevant to government
Cost-benefit model for government archives	Promoting professional learning and knowledge management in government IT
Create government-academic research cooperatives responsive to government IT needs	Prototype of a digital archive for national GIS data
Design a prototype digital agency	Role of XML and competing standards in integration of data systems
Design and prototype selected public utility services to the home / highway	Security agents for self healing and aware networks
Design functional requirements for archiving Welfare Reform data	Self-organizing information networks that provide a single window into the data sources of separate organizations
Develop and assess alternative scenarios of government IT operations	Tools for mapping the content and contact points of organizational networks
Develop and test alternative policy regimes for authentication	Understanding and developing best practices through analysis of informal contacts among organizations
Develop Web-based tools to manage electronic records	Web-based information resource to support IT outsourcing by government
Digital government scenario development, utilization, and evolution	Web-based support for volunteer-run after school programs
Effectiveness of decision support tools for public officials under varying conditions	White paper for legislators re: management of records in the electronic age
Empirical assessment of the diffusion of "best practices" in government IT	