

**A white paper on**

**International Collaboration on eGovernment Research**

Established at a joint meeting  
between the EU and US Delegations  
at the NSF's Fifth National Digital Government Conference dg.o 2004  
Seattle, May 23, 2004

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## Executive Summary

This white paper summarizes the discussions of a one-day, invitation-only, meeting held on May 23, 2004, immediately prior to the NSF's annual National Digital Government Research Conference, dg.o 2004 in Seattle, USA.

This meeting had several purposes, including:

1. To build on a year-long series of formal and ad-hoc discussions between US/NSF and EU officials and researchers. These discussions included:
  - dgo2003 International E-Gov Research Panel and a birds-of a feather session on the same topic
  - EU's annual eChallenges e2003 conference (October 2003, Bologna, Italy) U.S. digital government and digital society & technology research panel followed by a one-day meeting on possible mechanisms for support EU-US research collaborations. (Digital government/E-government was one focus area among others).
  - Video conferences between NSF IIS program managers and EU/IST program managers to keep a dialogue going and to prepare a framework for supporting some joint projects.
2. To better understand US and EU research programs, funding structures, partnerships
3. To explore common E-Government research interests, find complimentary strengths, differences, etc.
4. To define mechanisms for supporting continued collaboration, including:
  - Community building such as sharing calendars of events; linking to each other's websites, articles in each other's newsletters
  - Serving on each other's event program committees,
  - Organizing international E-Gov research workshops on specific topics
  - Hosting an annual international conference for DG/E-Gov research conference, alternating between US and Europe (and beyond)
  - Holding working group meetings on a routine basis,
  - Funding DG/E-Gov collaborative research projects by EU and/or US, for expanding existing research projects to include an international focus, providing small grants to explore research projects, and/or possibly creating a US and EU solicitation for joint research projects.
5. To prepare a document that reflected the outcomes of the meeting which could be shared widely, referenced in program solicitations, posted on US and EU websites, etc.

## Research Themes and Programmatic Issues Identified in the Meeting

Three research priorities were identified in the workshop: two high-level themes for eGovernment research and suggestions for a funding program.

### Theme 1: Information Integration and Use

The research issue is to establish what an open, standardized, generally accepted Architecture for eGovernment (IEEE 1990). This includes three principal research concerns: legal and social issues, government transformation, and software and data problems (Fig. 1).

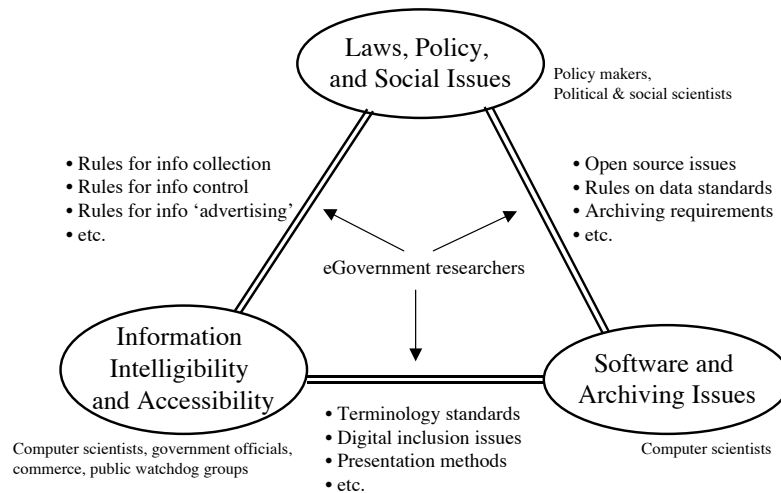


Figure 1. Three connected clusters of principal concern for international eGovernment research.

### Theme 2: Digital Democracy

This theme includes concerns of trust, civil rights and obligations to other countries, identity management, and enhancing democratic processes. Creating trusted and trustworthy systems is a challenge for government in various dimensions. Digital Government researchers of various kinds can help develop methods to specify, build, evaluate, and explain ICT to ensure the public's confidence in the reliability of user interactions with eGovernment resources and information. In addition, each citizen in a democracy has rights and obligations. IT can help manage differences across international boundaries. Identity cards can facilitate administration of these rights within and across countries. IT can also help combat voter apathy, evident in many EU and US elections.

### Theme 3: Research Maturity and Technology Transfer

This concern focuses on improving the time lag from initial research and prototype construction to final product. Exploitation and commercialization of research inventions is a major challenge on both continents and the adoptions of innovation in eGovernment requires special attention. Though there is no magic solution to solve the problem, research programs and projects can be structured to facilitate tech transfer.

This white paper documents the outcomes of the meeting and is organized in two parts. The first part is a distillation of the discussions with associated recommendations prepared by the editorial team who authored the white paper. The second contains details of the discussion, organized as a list of possible research themes and programmatic issues.

Twenty people participated in the meeting: 7 researchers from the EU, 9 researchers from the USA, 1 program director each from the EU and the USA, a meeting facilitator, and 2 note takers.

## **International Collaboration on eGovernment Research**

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# International Collaboration on eGovernment Research

## Part I

### Goal

This white paper summarizes the discussions of a one-day workshop held on May 23, 2004, prior to the NSF's National Digital Government conference *dg.o 2004* in Seattle, USA. The workshop explored the possibility of joint US-EU research projects focusing on eGovernment / Digital Government. (We use the terms interchangeably in this white paper.)

The need for introducing information technology to modernize and streamline all aspects of government has been recognized numerous times over the past few years (Computer, Science and Telecommunications Board, National Research Council, 2000, 2002; Cresswell, Pardo, & Dawes, 2001; Dawes, Bloniarz, Kelly, & Fletcher, 1999; Fountain, 2001, 2002; Pardo, Cresswell, Thompson, & Tayi, 2002). In response, the US National Science Foundation (NSF) in 1999 started the Digital Government program ([www.digitalgovernment.org](http://www.digitalgovernment.org)), which to date has funded some 50 projects, including computer science research (on topics as diverse as database information integration, geographical information systems, biodiversity and ecosystems, and regulation writing for legislation) and political and social science studies (on topics in governance and procedure). The NSF also initiated the dg.o conference series ([www.dgrc.org/conferences](http://www.dgrc.org/conferences)) and funded the establishment of the Digital Government Research Center DGRC at the University of Southern California and Columbia University ([www.dgrc.org](http://www.dgrc.org)) and the National Center for Digital Government at Harvard University ([www.ndcg.org](http://www.ndcg.org)).

During the same period, the EU created the research programme for eGovernment ([http://europa.eu.int/information\\_society/programmes/egov\\_rd/text\\_en.htm](http://europa.eu.int/information_society/programmes/egov_rd/text_en.htm)), which is based on the vision-driven eGovernment European policy that is laid out in the Communication of the European Commission No. 567 on eGovernment Policy (September 26, 2003; link: [http://ica.cordis.lu/search/index.cfm?fuseaction=lib.simpledocument&DOC\\_ID=6447491&CFID=382362&CFTOKEN=59427625](http://ica.cordis.lu/search/index.cfm?fuseaction=lib.simpledocument&DOC_ID=6447491&CFID=382362&CFTOKEN=59427625)). The council of ministers re-confirmed on 20 November 2003 that eGovernments is one of the key pillars of the eEurope2005 roadmap. The objective is modernization of European public administrations to improve public services and democratic processes and strengthen support to public policies. To that end the use of Information and Communication Technologies in public administrations shall be combined with organizational change and new skills. The research programme on eGovernment ([www.europa.eu.int/egovgovernment](http://www.europa.eu.int/egovgovernment)) is complemented by further instruments to achieve this objective, namely Best Practice Implementation and Policy Initiatives to achieve political commitment and leadership for the transition process. Europe has initiated dedicated eGovernment tracks in several conferences, such as the echallenge conference (<http://www.echallenges.org>).

Having reached a certain stability and maturity, the EU and NSF research programs turn to a set of common problems that have become more pressing over the past five years: ones that require international governmental collaboration. We identify two types of problems that require this collaboration. By their nature, cross-jurisdictional differences pose challenges and opportunities for eGovernment research. As discussed below, some of these problems are global in scope, such as international terrorism, cross-border health issues such as epidemics, the environment, international standardization, and so on. There are also those problems that each country or region faces separately but due to their complexity and importance require collaborative research to progress them adequately. These problems include addressing modernization of public administrations and the democratic deficit and overcoming the digital divide.

The goal of this white paper is to record the workshop discussion, and building upon that recommend the establishment of a new research program in international eGovernment jointly between the US and EU.

The white paper consists of two parts. Part I is a distillation of the workshop discussion, with associated recommendations for an international digital / eGovernment research agenda, produced by the editorial team who authored the document. Part II contains details of the workshop discussion, focusing on possible research themes and issues for a successful funding program:

- Information integration and use
- Digital democracy
- Research maturity and technology transfer

### **Definition: What is International eGovernment research?**

In this white paper we exclude from consideration research that is not explicitly international in nature. That is, we focus only on research investigating questions brought up by considering government from an inter-national perspective. These questions arise from differences among the jurisdictions and/or customs of countries. We identify the following five general spheres, each of signal relevance to digital government.

**Socio-political sphere:** The issue is making government (its operation, information, and all other aspects) accessible to people in various countries. It covers the important aspects of strengthening representative democracy, overcoming voter apathy, and addressing the democratic deficit. This includes translation of text into various languages; adaptation of information and presentation mode to conform to local customs, mores, and practices; conversion of practices and data to suit the population's levels of sophistication; etc. — all the functions that in the translation industry are called 'localization'.

**Health sphere:** The principal issues are the rapidity and effectiveness of sharing information in the case of international epidemics such as SARS, with associated issues of personal information privacy and freedom. Associated issues involve regulations about the production and transportation of food to other countries, such as the recent Mad Cow Disease episodes. Information technology can form a valuable partner to medical technology to address these issues effectively. This sphere can include the use of information technologies to coordinate both medical and administrative responses to international disease outbreaks.

**Jurisdictional sphere:** This sphere relates to international crime, including terrorism, and cross-boundary transportation, including immigration. Also here personal information privacy and freedom are likely to be impacted by advances in technology. Different societies' expectations about the availability and/or freedom of governmental information pose a specific challenge. Also included in this sphere is the role of national and international governments (EU, UN, etc.) in the emergence and control of international technology standards such as ICANN/IP6, W3C, etc.

**Commercial sphere:** The principal issues involve deepening international markets, including the convergence of an enlarged EU, international standards for corporations, products, manufacturing, safety, and liability. Agreement across government agencies in one country is difficult to achieve and across countries even harder. Nonetheless the rewards of perspicacious international regulations, homogenized data collection and presentation, streamlined contractual litigation, taxes and financial reporting, and consistent requirements for safety and rules of liability lie in increased private sector efficiency and higher standard of living for all. In

particular, the role of government in ensuring transparency and legitimacy of financial information is a central concern.

**Environmental sphere:** Of ever-increasing importance is the requirement for internationally consistent, clearly defined and measured, and effectively policed environmental policies and practices. Technology to support all aspects of this sphere will help ensure a better world for our progeny.

We expect that future international research projects will address some of these spheres as their domain of application.

The following examples of broad research areas are intrinsically multinational in nature:

- Cross border identity management and the prevention of illegal immigration, crime, fraud, and terrorism, while maintaining privacy,
- Identification, authentication, and data collection for the administration of citizens, involving data rights of subjects, risk management (technological, economic, and social), failure management, and system interoperability,
- Emergency response and crisis management, including flexibility required in multinational and multicultural situations,
- Dealing with civil strife and national disaster that cross boundaries, such as epidemics and earthquakes,
- Environmental monitoring and preservation.

## Research Themes and Objectives

The abovementioned spheres present a wide range of opportunities to apply IT research.

Discussion at the workshop focused not on IT applications alone, but on research problems, the grouping of these problems into general themes, and the way funding programs can be structured to help ensure success. Discussion centered on the following three topics:

- **Information integration and use:** Though collected locally, information often needs to be shared, distributed, and presented widely. Reconciling information (whether natural language, symbolic information, or numerical data) within a single administration still is a challenge, and exchange across government agencies or companies is difficult enough in one, country. Doing so across countries presents additional complexities such as different measurement standards, different laws governing privacy, and so on. Research problems in this arena include translation and localization for natural language, standardized open eGovernment architectures including principles and guidelines for developing eGovernment administrations, including standard eGovernment components, organizational solutions, service definitions, administrative processes, and technical data standardization, e.g. APIs for raw information, etc. We discuss this in more detail in Part II, Section 1.
- **Digital democracy:** Under this theme we identified two challenges. The first concerns issues of international democracy across country boundaries and focuses on concerns about the amount of personal information governments in different countries demand from an individual, and the associated issues of international data protection, privacy, and trust in the government agency. The second concerns major national challenges that most western democracies are facing, that afford opportunities for novel uses of ICT, such as fighting apathy and ensuring democratic legitimacy. Research problems in this arena focus on e-

inclusion with the need for better presentation and understandability of information for all; e-participation with the need for novel tools to support group deliberation, conflict resolution, and consensus building; and e-communities with the need to understand how to support large scale virtual communities to foster active citizenship. We discuss this in Part II, Section 2.

- **Research maturity and technology transfer:** Experience in the NSF’s Digital Government program has showed that one of the principal bottlenecks in the R&D process is the transitioning of research results into practical use in the government. The European eGovernment program addresses this challenge with a number of accompanying measures such as the early and broad industrial involvement into the research process, best practice implementation cases within administrations and policy initiatives to ensure leadership. Even with serious and well-intentioned government partnership in research projects, the fact that researchers are not in a position to deliver turnkey-quality solutions, software systems or information, and that government agencies are not in a position to devote vast resources to solution and software testing, has highlighted the ‘Technology Transfer gap’. Ideally, commercial enterprises would step in to bridge the gap, but in the US practice this has not yet occurred in more than a few isolated cases. In Europe, involvement of industry has led to large and complex initiatives, which now face management challenges. Although no clear solution is at hand, several steps can be taken to help narrow the gap. We describe the discussion of this issue in Part II, section 3.

Given the wide-ranging nature of these themes, workshop participants spent some time discussing methods for comparing potential projects to assess their relative merit for funding. Ultimately, the following criteria for evaluating and selecting eGovernment projects were identified:

- Personal safety and security
- Health
- Environmental integrity
- eDemocracy
- Social issues and justice
- Commercial issues, efficiency, and wealth
- Scientific and technological interest
- Education

### **Nature of Collaboration Projects**

Given the unique nature of digital government, research projects have been required to adopt a somewhat special format. We discuss various aspects to be considered.

**Government and commercial partners:** Both in the US and Europe, each project must include one or more government partners, whose function it is to provide a real-world instance of the research questions being addressed, and to work with the researchers to test the research findings. In the EU, each project must also include commercial partners, and they must represent a number of EU countries. The partners need to ensure that the research is addressing a significant government challenge and that the deliverables meet the needs of government and are capable of being exploited further across Europe. One of the commercial partners must take responsibility for this exploitation of the results and deliver an exploitation plan to the Commission at the end of the project. Merging these requirements—including commercial and government partners in addition to multinational projects—may further increase an already rather daunting bi-continental management problem. However, dropping one or both of these requirements significantly diverges the research projects from their respective norms.

One solution is to encourage both commercial and government partners, but to allow a somewhat looser internal coupling among research partners, enabling each side to conduct business more or less as it is accustomed to. Another solution is to require that projects be primarily situated in one continent or the other, with much smaller liaison or partnership from the other continent. While expedient, this last approach may limit some of the benefits of cross national collaborations.

**Project administration and management:** The related issue of project administration also adds to the management burden. Requiring projects to adhere to the formal reporting and other administrative requirements of both funding agencies would quite likely necessitate a dedicated administrator position in each project, an expense not really desirable. Coupled with the overall project management overhead, also exacerbated by bi-continental differences in research methodology, it may simply be best to recognize that bi-continental projects have two funders, whose funding allows the administrative and management costs to be split, with a resulting economy of scale. Prior to initiating projects with multiple sponsors it would be useful to identify the common administrative and financial reporting requirements, with an eye to establishing common methods to reduce overhead.

**International collaborations:** Although the eGovernment research projects funded by the EU can be international, they are usually all localized to EU countries only. Only a handful of NSF-funded Digital Government projects are international. However, there exists a great need and many opportunities for collaborative EU-US research projects. To ensure parity and facilitate funding, it might be required that proposals include more or less equally large representation from each continent. But traditional differences in project size—EU eGovernment projects can range from 6 to 60 partners (who may not have worked together previously); NSF Digital Government projects typically include two or three—need to be taken into account; North American researchers are typically less accustomed to managing large projects.

One solution is to strengthen inter-project collaboration support mechanisms such as joint conferences, workshops, virtual communities of experts, exchange of researchers and experts, or topic related joint task forces and publications. The current provision of supplemental funding for NSF ITR projects to collaborate with EU partners is one example of an opportunity to build experience and relationships.

**Funding mechanisms:** Various models for international funding exist. In one model, partners develop a single proposal, but submit it separately to each continent's funding agency; successful proposals are those accepted on both sides. This allows the traditional particular requirements of each funding agency to apply, but introduces a coordination task on the side of the funding agencies, because a problem occurs when only one continent's proposal is accepted. Such coordination could adopt proven international cooperation mechanisms such as the global Intelligent Manufacturing Systems program, IMS. It will be necessary to reconcile differences across sponsors in how they solicit, review, and decide upon project proposals.

## **Conclusion and Next Steps**

Given the well-known problems inherent in research collaborations, plus the increased management and reporting burdens discussed earlier, it is *vital* for warm-starting projects that potential partners spend at least a year working on a small version of their problem in order to get to know one another, shake out management issues, educate one another and the commercial and government partners about research methodology, the role of students, expectations on deliverables, etc. We therefore feel that the European model of roadmapping projects as specific support actions and the NSF's model of Small Grants for Exploratory Research (SGER) is a very valuable one to adopt. After one or more face-to-face meetings to establish an initial small

project, partners can be funded for a year's work to work out the abovementioned details. Only upon successful completion of this year should a full proposal be developed and submitted. It should most certainly not be the expectation that awardees more or less automatically graduate to full project status. This suggests that the funding agencies fund at least twice as many SGER projects as the number of full projects they expect to be able to fund eventually.

In order to achieve these goals, we identified the following steps in the workshop.

1. **Meetings.** Opportunities for face-to-face meetings include EGOV04, the third EGOV conference within the DEXA conference framework, to be held in Zaragoza Aug 30 – Sep 3, 2004 ([http://falcon.ifs.uni-linz.ac.at/news/cfp\\_egovernment2004.html](http://falcon.ifs.uni-linz.ac.at/news/cfp_egovernment2004.html)), whose chair, Dr. Roland Traunmüller, was one of the EU delegates to this workshop, and promised to facilitate a meeting to explore collaboration. Also, the e-Challenges 2004 conference in Vienna in October which is supported by the European Commission (<http://www.echallenges.org/>), one of whose program committee members, Dr. Bernhard Katzy, was one of the EU delegates to this workshop and where, in 2003, the first NSF-EU panel took place. Another meeting is the EU IST conference in The Hague, to be held Nov 15–17 2004 ([http://europa.eu.int/information\\_society/istevent/2004/text\\_en.htm](http://europa.eu.int/information_society/istevent/2004/text_en.htm)).
2. **Small grants for exploring collaborations.** The NSF has announced the availability of funds to supplement existing ITR proposals for the explicit purpose of exploring joint US-EU research. Support of up to \$100,000 for this effort was announced in May, with a June 30, 2004 deadline for supplemental funding requests. NSF is currently reviewing these requests and may have decisions to announce by the time of the DEXA conference.

## Part II

### Research Themes and Programmatic Issues Identified in the Workshop

In this part we briefly summarize three priorities identified in the workshop: two high-level themes for eGovernment research and comments and suggestions to help ensure success of a funding program. Subsequent meetings may choose to use this material as a starting point to identify a set of high-impact research challenges.

At the end of this section we list the results of a straw poll held among workshop participants, to informally obtain their estimate of the relative importance of a list of research topics.

#### Theme 1: Information Integration and Use

The international digital / eGovernment context is characterized by the existence of many localized, heterogeneous information collections. This is the inevitable result when information is gathered and administered locally within each country (and sometimes even regionally or individually by each administration within a country), according to each country's own specifications and needs. Rarely do these specifications agree across countries. Yet the increasingly internetworked modern world requires effective information sharing across countries. Transforming and reconciling disparate information collections (whether numerical data, symbolic data, natural language, or any other type) across government agencies or companies is difficult enough in one country; doing so across national boundaries often presents additional complexities such as different measurement standards, different laws governing privacy, and so on. The research issue is to establish what an open, standardized, generally accepted Architecture for eGovernment that IEEE (1990) defines as the structure of components, their relationships, and the principles and guidelines governing their design and evolution.

This theme can be subdivided into three principal clusters of concern for eGovernment researchers, illustrated in Figure 1. These are legal and social issues, information accessibility/intelligibility from which principles and guidelines for eGovernment systems can be derived and democratically discussed and usage questions, which include (inter-) organizational and managerial issues of modernizing and developing public administrations, and finally and software and data problems. We discuss them in turn.

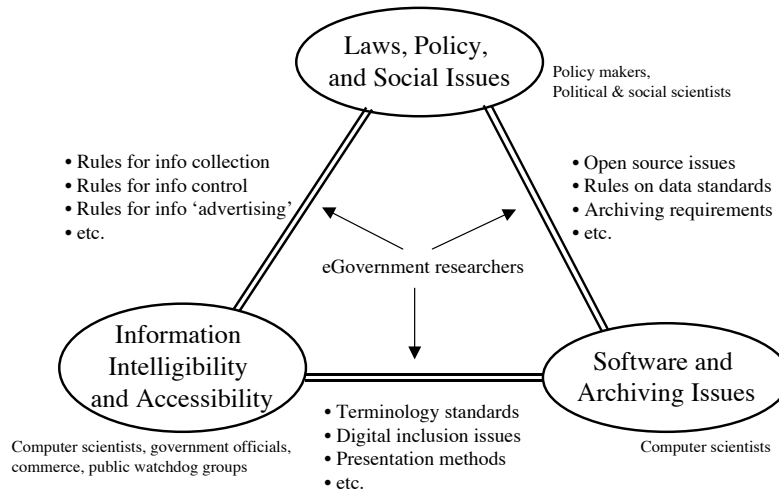


Figure 1. Three connected clusters of principal concern for international eGovernment research.

### **Cluster 1: Social and Legal Aspects**

This cluster concerns the principles, laws and policies that govern information collection, administration, and use. It is the primary concern of lawmakers and policy experts. Within eGovernment research, political and social scientists study the effects of these laws and policies on society. Issues include the following:

- What are policies, desiderata, and agreements regarding eGovernment and information sharing?
  - Policies and guidelines regarding desirability of eGovernment services, especially with regard to sharing information about sensitive topics such as pollution, health care procedures, governmental diplomatic and intelligence activities
  - Legal agreements, guarantees, and auditing about information accuracy and currency
- Is information public or private?
  - Cultural implications: personal privacy, etc.
  - Technology support for the alternative models
  - Value/incentive in each case
- Is government software open?
  - Development and use: software, communities of support and use
  - Examination: implications for politics, economics, society/culture
  - Open source and open data standards
  - Trustworthiness and hackability
- What rules govern information collection and information ‘advertising’?
  - Personal privacy against government
  - Intra-governmental inter-agency data sharing or not
  - Policies regarding information ‘push’ by government for political purposes or by others for commercial purposes; truth in advertising rules, etc.

### **Cluster 2: Government Transformation, Information Intelligibility, Accessibility, and Usage**

Research problems in this cluster include the context of information and data, from which its meaning can be derived. This includes several layers starting with language translation and localization (conversion to local customs and norms, e.g., metric to imperial measures, paraphrasing to avoid offense, etc.), nomenclature standardization, or public access via the world wide web, for digital inclusion. A second layer concerns usage in / for administrative processes and services with workflow mechanisms, status and other meta-information to relate information items (the traditional dossier number) to the administrative process that governs its use. A third layer concerns usage for government services as they are defined by policy, including the decision on which agency or private institution is charged with delivering the service, how its operation is audited and how inter-organizational exchange of information between services and contexts is organized. This cluster is the primary concern of people whose type as yet is often unnamed, but that today would include public administration officers and researchers, new public management researchers and officers, software development managers, representatives from public information watchdog groups, emerging chief technical officers of governments and agencies eager to connect and integrate their information with their equivalents in other countries, and commercial software development managers. With respect to eGovernment research, questions include the following.

- What are Information integration mechanisms for the purpose of information sharing and access?
  - Standardized metadata and ontologies
  - Standardized data usage documentation, including manuals, glossaries, etc.
  - Data integration software and alignment discovery systems
- How is information localized for presentation?:
  - Multi-linguality and translation
  - Required and/or recognized standards and norms for displaying information (including technical, such as units of measure; cultural, such as nudity, the aged; etc.)
  - Handling space and time in e-government application domains across borders and cultures
- How are administrative processes designed and Inter-governmental process integrated (G2G)?:
  - Government service definitions and process documentations
  - Change and Transformation Management
  - Software interoperability across countries, government levels, institutions
  - Data/information procedure alignment and streamlining across jurisdictions and agencies
- How is digital inclusion increased through access for the technologically and physically disadvantaged?:
  - Displays for the deaf, blind, etc.
  - Information delivery processes and solutions for special groups, e.g., for people without computers
  - Simplified/reduced data forms and delivery for nonspecialists or people with limited-bandwidth access that remains accurate and current

### **Cluster 3: Software and Data Issues**

This cluster is presented in standard three tiers that include all research problems at the level of IT system development, IT system integration and specialized resources for data collection, storage, and conversion, and software construction, evaluation, maintenance, and upgrading. It is the concern of system architects, computer scientists and data archivists. It includes the following eGovernment research concerns.

- Data standardization:
  - APIs for raw data (numerical, textual, symbolic, of all kinds)
  - Homogenization of rules regarding information release
  - Procedures regarding partial but still useful data integration
- Data security and sharing mechanisms:
  - Technology to observe data security and/or privileged access across different classes of user
  - Algorithms and methods for reconciling overlapping data of differing granularity, and maintaining anonymity
- Software evaluation:
  - Metrics to evaluate software performance, accuracy, speed, reliability, etc., without regard to operational setting; so-called glass-box evaluation methodology
  - Methods for evaluating the utility and effectiveness of IT in operational settings; so-called black-box evaluation methodology

- eGovernment middleware platforms for trusted integration with special focus to privacy in data storage and archiving:
  - Decision between centralized, agency-based information/data collection and networked agencies and organizations, distributed sensor-based information collection. (Integration, sharing, privacy, etc.)
  - Support for data-intensive multi-dimensional modeling for “what if” policy changes, forecasting, etc.
  - Immediate-term storage and accessibility, site mirroring policies, etc.
  - Short-term and long-term data preservation technology and policies
- End-to-end eGovernment applications for dedicated services
  - Modeling of eGovernment services and their economics and benefits
  - Modeling of administrative procedures and processes
  - Secure, web-enabled, mobile eGovernment applications

## **Theme 2: Digital Democracy**

### **Trust**

A common thread in this research theme is the need to ensure citizen trust in the ICT that supports democracy. Creating trusted and trustworthy systems is a challenge for government in various dimensions. Digital Government researchers of various kinds can help develop methods to specify, build, evaluate, and explain ICT to ensure the public’s confidence in the reliability of user interactions with eGovernment resources and information. At least the following aspects are involved: public perception, public expectations, robust technology, trusted and secure computing, personal control over government services, and responsible IT-related governance.

### **Civil Rights and Obligations in Other Countries**

In a democracy, each citizen has rights and obligations. With regard to rights, IT can help manage differences across international boundaries. What rights, for example, does a US citizen have in Europe, and European in the US? How much information must one provide in each place, and to whom? A clear challenge for Digital Government research is harnessing the power of IT to inform travelers of their rights, aptly and succinctly, as needed. Especially in problem situations (with authorities, accidents, dishonest or unhelpful merchants, etc.), such information may make a telling difference. Similarly, with regard to obligations, intelligently designed IT can inform the traveler about laws, requirements, prohibits, and even social norms and help him or her avoid embarrassment or worse.

### **International Identity Cards**

Identity Cards facilitate administration within a country. They do, however, impact the holder’s privacy, if for no other reason than that they provide a convenient single identifier by which the holder’s actions can be integrated and traced. Clearly, an international Identity Card could subsume some of the functions of a passport, an international driver’s license, health records, an insurance card, a normal identity card, and even, if desired, a credit card.

## **IT to Help the Democratic Process**

A common problem in democracies is voter apathy. The recent EU elections in some countries evinced disturbingly low voter participation rates (Slovakia: 16.6% compared with the national election rate of 70% two years ago; Poland: 20.4%; Netherlands: 39.1%). This is not unavoidable, though; in Luxembourg, where voting is mandatory, the rate was 90%. A research challenge for Digital Government is how ICT might change/influence citizen behavior, for example with tools to support elected representatives, new advocacy instruments, better information dissemination, technology to bring together ‘virtual communities’ around issues, to support group deliberation, conflict resolution, democratic decision making, and the dissemination of the community’s point of view. Such tools such work at both the small (100-person) scale and the large (100,000-person) scale, and should integrate voice, visuals, images, text to provide multi-perspective views on the same information to support people with different communicative and IT skills. Given the potential for inappropriate influence-mongering inherent in such ICT, serious social and political studies are required to determine their impact; the question hence becomes not just a technical one, but involves the political culture, NGOs, and even the nature of representative democracy.

## **Theme 3: Research Maturity, ICT Innovation, and Technology Transfer**

It is common wisdom among software builders that finalized product development takes about ten times as long as initial research and prototype construction. If true, this somewhat depressing statement bodes ill for small- and medium-scale research programs: unless projects are funded for about a decade, one cannot really expect deployable and useable results! Although this picture is too bleak, experience in the NSF’s Digital Government program has shown that the gap between prototypes built by researchers and ICT systems used in government offices is indeed significant, even with serious researcher-government official collaboration over several years. The reasons are obvious, and need no discussion.

The obvious partner to bridge the gap is commerce. To date, however, the US Digital Government program has not had much success in transitioning research results into companies, for a variety of reasons. Taking a different approach, the EU’s eGovernment program funds projects only if they include one or more commercial partners, whose role it is to co-develop the research prototypes, perform system hardening and testing, create documentation, and complete all other time-consuming tasks required to produce a real product. Yet, exploitation and commercialization of research inventions is a major challenge on both continents and the adoptions of innovation in eGovernment requires special attention.

Though there is no magic solution to solve the problem, research programs and projects can be structured to facilitate tech transfer. Given that governments—in contrast to business—are requested to be risk-averse, we expect that more demonstration piloting effort has to be undertaken in the early phases of the innovation processes in order to reduce risk of project failure and shorten take-up durations. The remainder of this section lists some important impediments and major issues.

### **Defining the Program**

Ultimately, a research program succeeds to the extent its funded projects advance the state of knowledge and/or produce results that are taken up in society. In our context, when setting up a research program, care should be taken from the outset to establish explicit what in German is

called *Begleitforschung* (accompanying research) to identify evaluation criteria, deploy methods, and undertake ex ante and ex post impact assessment of the R&D. This includes not only the obvious measures of technology functionality and quality, but also studies on the impact on government procedure and the compliance of systems with the government's generally accepted auditing principles and standards. Such research requires about 10% of the resources of the research program and needs a dedicated, separate organizational structure outside the control of management to yield in high quality results.

Once the basic high-level goals and corresponding structural criteria have been established, definition of the program and its projects can proceed through a process of cyclic refinement, as illustrated in Figure 2. This processes is new to many principal investigators and project managers and should be explicitly documented in the program management routines.

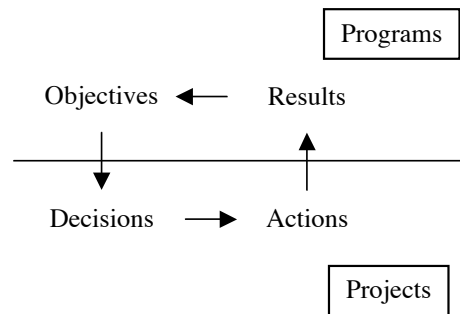


Figure 2. Cycle of definition of eGovernment programs and projects.

### Researchers and Government Officials: Learning One Another's Language

Every project should have the top-level goal to address a true research problem, one that is also exemplified in one (or hopefully several) government situations and agencies in hopefully several countries.

Establishing a workable collaboration between researchers and government officials is not simple, as experience has shown. Differences between the worlds inhabited by the parties lead to very different goals, expectations, timelines, and values. Time and frequent meetings are required before a project can be finally defined. These steps include:

- Identify pressing everyday real-world problems within multinational government whose solution is not straightforward but requires true research
- Situate the problem in the Digital Government / eGovernment research framework.
- Translate legal / administrative jargon into technical jargon and vice versa
- Define the overall *why* and overall *how* structure of the project
- Spell out the expected and desired results of the project
- Spell out the new governing and administration procedures should the project be successful

### Evaluating and Evaluation Measures

Of critical importance is the definition and ongoing evolution of criteria for success or failure. We suggest that programs keep a reflective equilibrium of undertaking research with clear objectives and the update not only research results but also their evaluation criteria. By specifying clearly what will be measured, how, and why, all parties can come to an understanding of the true

scope and expected value of the project. By updating evaluation criteria learning evolves as an understanding that is critical to the establishment of realistic expectations and the avoidance of potential ultimate disappointment. The research may or may not work out, but it should be clear to everyone what was tried, that it was an appropriate thing to do, how well it worked, and what was learned for future projects.

Importantly, evaluation criteria are of various types, and include:

- **Technical evaluation** of the performance of the developed prototypes for the desired functionalities
- **Impact / usage evaluations** of the actions of government personnel and users (at the personal, local, and global levels)
- **Evaluations of deployment** and procedure integration costs, including infrastructure changes
- **Evaluations of government** efficiency and cost with and without the research results

### **Deployment in General**

Deployment of the research results in government agencies is a complex and expensive undertaking, even for commercial enterprises, who generally are better equipped to undertake consulting than researchers. More extensive usage of joint projects amongst commercial enterprises, administrations, and researchers is posed to equally improve deployment and research quality. Instruments such as pilots, demonstrations, action research, communities of practice, or administrations acting as living laboratories for the study of how new information systems work in real-life settings are example of collaborative undertakings, which break the traditional sequential logic of basic research, applied research, and deployment that results in the long innovation durations. Attention should be paid to at least the following issues:

- Scoping studies determining the generality of results (all government is local!)
- Efforts to ensure continuity across administrations
- Supporting the deepening and contextualizing best practice to promote feasible innovation in institutions
- Sensitivity to the reorganization and culture change required of government staff
- Attention to issues of eGovernment in federated and cross-national contexts

### **Change in Governmental Procedures**

The successful adoption of new ICT in most cases requires change in governmental procedures. Experience has shown this to be difficult, for a variety of reasons, including workers' unwillingness or lack of time to try new procedures, their fear of redundancy, dislike of technology or its method of introduction, etc. Care should be taken to locate a sympathetic and enthusiastic champion within government for the new project, and likely early adopters should be encouraged to help specify the functionality and ICT interaction paradigms and interfaces.

It should be stressed that public administrators are increasingly becoming knowledge managers, which underscores their role as innovators and guardians of good governance for the generations to come. With this view, change and modernization of administration, akin to the BPR movement in business, can be facilitated.

## **Straw Poll of Research Topics**

At the conclusion of the workshop, participants conducted an informal straw poll to rate the research topics identified during the day. Each participant received four votes, and could vote any way at all. The total number of votes cast was 84. The results are as follows.

### **Voting Results**

- e-inclusion: better presentation and understandability of information **(12)**
- Semantically useful data sharing **(12)**
- Information sharing and protection **(8)**
- Development frameworks for evaluation, impact analysis, and measurement for e-government. **(8)**
- Security, ID, access control **(8)**
- Characteristics, skills, and tasks of public administration with respect to e-government? **(7)**
- Federation, meaning coherence among institutions **(7)**
- e-participation to support deliberation, conflict resolution, consensus building **(6)**
- Open source and libre software **(5)**
- Government organization and processes, including measurement and evaluation **(5)**
- Digital democracy **(3)**
- Improving the success rate of organizational change **(3)**
- Strategic alignment **(0)**
- Digital inclusion **(0)**
- e-communities: support large scale networking **(0)**

## **Appendix**

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