# Collaborative E-government

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## 1. Introduction

Governments around the world are facing increasingly complex problems. In many cases, solving such problems require several government agencies, non-profits and private organizations to work together [1]. Information and Communication Technologies (ICT) play an important role in facilitating these interorganizational collaborations. Moreover, in some cases, ICT adoption and use is transforming the ways in which these organizations interact among themselves. In fact, ICT use in government is also transforming how the citizens interact with governments and how government conducts their daily operations and tasks. As part of this movement, citizens and governments themselves are looking for increased transparency, accountability and performance efficiency. Reaching this goals require for collaboration, knowledge and information sharing for effective management and provision of government services.

The ICT-facilitated collaboration environments for government are referred to as *Collaborative e-Government*. Collaboration can be loosely defined as "a process or a set of activities in which two or more agents work together to achieve shared goals." Collaboration is an emergent process of joint decision making in which solving differences, identifying interdependencies and building ownership of decisions play a key role [2, 3]. Collaboration models can be developed along different dimensions. Interaction-based collaboration models focus on the interacting agents, while the content-based collaboration models focus on what is shared for achieving common goals. *Interaction-based collaborations* occur within and across governments (G2G collaboration model), between governments and private or non-profit organizations (G2B), between governments and citizens (G2C) as well as among international governments in a static and dynamic fashion in order to achieve complex common goals.

*Content-based collaboration models* can differ in their focus on content types of sharing: sharing of information (government data, citizen comments/opinions), services, processes (or tasks/operations), knowledge (e.g. experiences, know-how), resources (tools, platforms, assets, skills, equipment), policies (e.g. commenting, deliberations), decision making (governance) as well as strategies. One can also look at the temporal dimension, so that some collaboration models can be characterized as short-term joint projects and others can be long-term projects based on permanent partnerships.

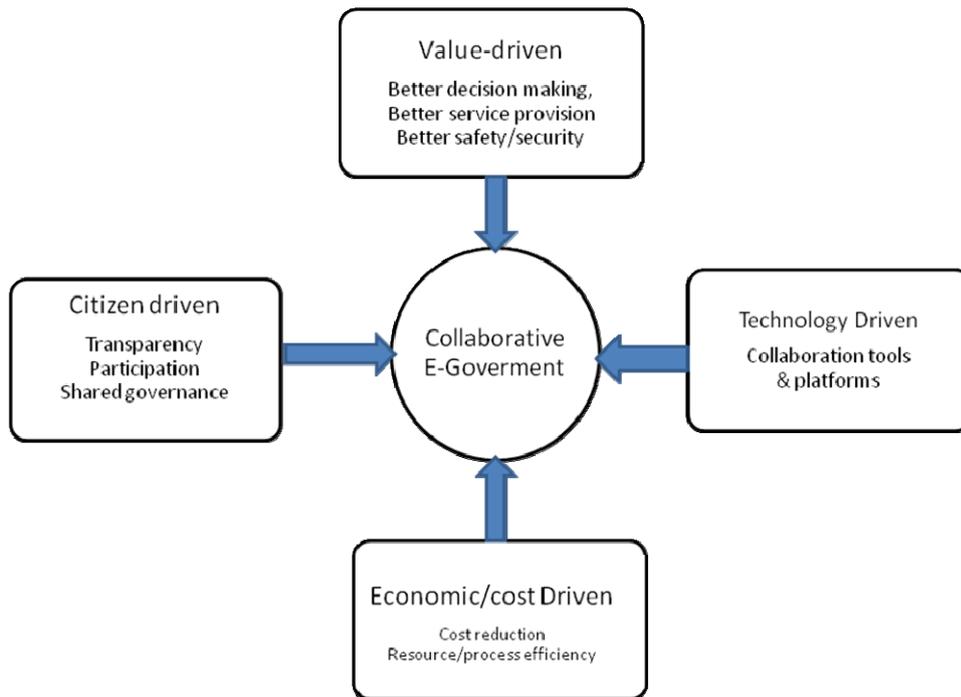## 2. Collaborative e-Government Forces

According to the Open Government Directive, "Collaboration improves the effectiveness of Government by encouraging partnerships and cooperation within the Federal Government, across levels of government, and between the Government and private institutions" [4], but it is not clear what drives collaboration in government. The motivations of e-government collaborations may vary. We may have different motivational forces that drive the Collaborative e-Government as shown in Figure 1.

The value driven forces make governments to provide better decision making capabilities and enhance better service provisions and achieve domain specific goals. Collaborations in emergency management, public safety management, and import-export customs all intend to add value to government services and operations through G2G and G2B collaborations. The value-driven collaboration may be triggered by external forces such as natural disasters (e.g. Hurricane Katrina) or man-made events (e.g. 9-11 Terrorist attacks), which make the governments realize the gap in value generation, and force them to innovate or transform through collaboration.

Citizen forces drive governments to provide citizen participation platforms where they could participate and interact with the governments (C2G collaboration). Citizens want to provide their opinions in policy making, link themselves to governments to monitor activities and decision making process, and demand more transparency through information sharing and government accountability. The economic/cost driven forces demand governments to collaborate for reducing costs and gaining efficient utilization of resource utilization. The business process re-design and process monitoring within and across different government entities are examples of G2G collaborations driven by the economic forces.

Technology driven forces have been pushing collaboration and innovations in governments by providing alternative and easy-to-use technology tools and platforms. Technology enables government to link data, people and resources together to transform and innovate through collaborations. One example is the popular social media platforms that are collection of tools that allow the G2C interaction, linking government and citizens, including discussion boards, social networking, commenting/rating tools, instant messaging, audio/video conferencing, and mobile devices. These social media-based citizen participation promotes an unprecedented quantity and quality of collaboration between citizens and governments.

Other technologies that facilitate and play an integral role in many different types of collaborative e-government scenarios include Enterprise Architecture, workflow management, business process automation systems, online community-based systems, online real-time communication systems, online resource sharing and management systems, and many more.

**Figure 1 Collaborative e-Government Forces**

Benefits of collaborative government are well known. The sharing of information allows a smooth process design that will provide better services to citizens, optimize and reduce the impediments to improving government performance and will promote the situation awareness that supports well-informed, collaborative decision making and joint action. The collaborative e-government can apply collective intelligence for innovative solutions to problems as well as provide shared governance that ultimately fosters the trust and confidence of citizens in government.

Some of barriers for collaboration include lack of agreement in goals and strategies, lack of funding, external influence over decision-making, organization's self interest over common goals, lack of interoperability among systems, as well as lack of champion to lead the collaborative initiatives.

## 3. Collaborative E-Government Projects

The newsletter "Government by Collaboration" [5] reports a set of example collaborative e-government projects, as summarized in Table 1.

**Table 1 Examples of Collaborative e-Government Projects**

| Collaborative e-Government Projects | Description |
|---|---|
| Veterans Information Systems Technology Architecture (VistA) - Department of Veterans Affairs | Collaboration with government, industry and hospitals to develop fully integrated electronic health information system for veterans. |
| Michigan Business One-stop | Process redesign and collaboration with the broad business community for an online service that guides users who want |

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|---|---|
| | to start, operate or change a business. |
| Geospatial One-Stop project: data catalog | a portal hosting data from federal, state, tribal, and local governments, universities, and the businesses to access geospatial data and services. |
| The Environmental Exchange Network - EPA | collect and exchange environmental data with EPA partners and stakeholders in a cost effective manner |
| ParticipateDB (http://ParticipateDB.com) | A collaborative catalog for online tools for participation (aka tools for Web-based engagement, eparticipation, online deliberation, etc.) |
| GovLoop | A social network for public servants and people supporting government to connect and collaborate for sharing best practices, and creating a community to provide better services. . |
| BetterBuy – GSA | A collaborative project among GSA, NAPA and ACT/IAC to provide a collaborative technology platform that enables the public to submit, comment, and vote on ideas on the federal acquisition process. |
| MuniGov 2.0 (www.munigov.org) | The virtual world (Second Life) community of federal/state /municipal and international governments meeting via avatar to talk shop about the policies, tools, trials and tribulations of Government 2.0 or just government in general in order to improve citizen services and communication. |
| GCPedia – Canadian Government Wiki | a community-built Wiki – knowledge base for the Public Service for easier collaboration, and faster and more accurate information sharing |
| STORK –EU's Secure Identity Across Borders Linked | European e-ID interoperability platform that allows EU citizens to establish and authenticate e-identity across borders and to access e-government services. |
| UK government portal (directgov.gov.uk) UK business portal (businesslink.gov.uk) | "joined-up" or collaborative government for collaborative and citizen-centric service delivery |

## 4. Special Issue Research Issues and Papers

Regardless some success cases of collaborative e-Government projects, substantial theoretical, practical and implementation issues and challenges need to be addressed. This special issue features a collection of "best papers" selected from the 11th International Conference on Digital Government Research (dg.o2010) that are devoted to address the challenges and issues of collaborative e-government. Table 2 lists some of the challenges and the corresponding papers that provides findings from their studies. The selected papers discuss technical, managerial, social and policy issues of collaborative e-government, and provide findings from the empirical and technical solutions. The brief summaries of the paper are as follows.

**Table 2 Research papers and research issues addressed**

|   | Research issues | Papers |
|---|---|---|
| 1 | What are some of the key factors that predict and facilitate the collaboration in e-government? Even though the four forces of e-Government collaborations provide a feasible model, empirical studies are needed. | Rational Choice and Institutional Factors Underpinning State-level Interagency Collaboration Initiatives<br>Christine B. Williams and Jane Fedorowicz |
| 2 | The collaborations can be transient or long term partnership-based. What are the appropriate models and approaches to reduce risks and sustaining the collaborative e-government projects? | "Can Enterprise Architectures Reduce Failure in Development Projects?"<br>Marijn Janssen & Bram Klievink |
| 3 | How can the technical challenges such as interoperability among heterogeneous application systems be overcome for rapid sharing of information needed in organizational, regional and global collaborative e-government? | Resource Sharing using UICDS Framework for incident management.<br>Basit Shafiq, Soon Ae Chun, Vijay Atluri, Jaideep Vaidya, Ghulam Nabi |
| 4 | Redesigning cross-boundary processes can be challenging in collaborative e-government. Is there a process redesign approach that can facilitate the collaboration? | IT enabled logistics procedure redesign for high value pharmaceutical shipments: the application of e3-control methodology<br>Jianwei Liu, Allen Higgins and and Yao-Hua Tan |
| 5 | How does the new technology such as social media impact the collaborations and new innovations? | Promoting Transparency and Accountably through ICTs, Social Media, and Collaborative E-government<br>John Carlo Bertot, Paul T. Jaeger, and Justin M. Grimes |
| 6 | Does citizen engagement through different interaction channels result in different confidence and trust with the government? How does the collaborative e-government foster the citizens' trust and confidence in government? | Public Input Methods Impacting Confidence in Government<br>Lisa M. PytlikZilllig, Alan J. Tomkins, Mitchel N. Herian, Joseph A. Hamm, & Tarik Abdel-Monem |
| 7 | How does one measure the satisfaction and quality of service of online services and engagements in collaborative e-goernment? | Quality and Impact Monitoring for Local eGovernment Services<br>Antonio Candiello, Andrea Albarelli, Agostino Cortesi |

Addressing the research challenge question 1 in table 2, Williams and Fedorowicz tries to identify the factors that can predict and explain the state-level interagency collaboration of creating a Public Safety Network (PSN). They use factors from two complementary theories of organizations, i.e. the Rational Choice theory and the Institutionalization theory. The Rational Choice theory claims that the organization's decision to participate in a collaborative network such as PSN depends on the needs to collaboration, the available resources and the costs that may be incurred. On the other hand, the institutional theory predicts that the organizations tend to enter into collaboration due to the social influences that are external to the organizations such as the coercive pressures that are often associated with the regulatory mandates and compliances, the mimetic pressures that force organizations to mimic the neighboring or similar organizations, and the normative force that are a set of expectations and norms

in the similar organizations. The authors gathered and analyzed the survey data from 80 state and local PSNs and the 50 state profile data. The findings show that the Rational Choice theory factors, high needs, resources and costs, are good indicators to generate PSNs with more participating organizations. On the other hand the findings show that the institutions that embrace reform and professional management practices do not necessarily determine the PSN participation. The institutionalization rather than a culture of innovation is associated with PSN success indicators, suggesting that maturity associated with more experience, better operational routines and increased organizational competence plays a bigger role in interagency collaborations.

Marijn Janssen and Bram Klievink explore in their paper the importance of Enterprise Architecture in reducing risk in inter-organizational collaboration. Given that architectures are instruments either to describe components in a system or to guide information projects, they argue that they are potentially useful to manage project risks in inter-organizational collaboration. Working with a group of 15 government officials that had participated in inter-organizational ICT projects in the Netherlands, they explore the relationship between Enterprise Architecture, Risk Management and project success or failure in 14 large complex projects. Findings show that project managers make little use of Enterprise Architecture as an instrument for Risk Management. They conclude that Enterprise Architecture needs to give explicit attention to Risk Management and to reduce project failure. However, more empirical research is needed.

Information sharing is the essential ingredient for effective emergency response and crises. The challenge faced in the government agencies is that they use different types emergency management applications . In order to facilitate the information sharing for e-government collaborations, Shafiq and his colleagues adopts a middleware Serivce Oriented Architecture (SOA) framework called the Unified Incident Command and Decision Support (UICDS) that facilitates the information sharing across diverse client applications. Each client application has an adapter plug-in to the UICDS infrastructure to convert the native data format to standard-based data to promote the sharing. This information sharing capability include the emergency related resource discovery and resource requests using the UICDS infrastructure and a resource adapter to pull resources required in emergency management. The semantic based approach for resource discovery and service composition is reported. The prototype system facilitates the resource sharing among NJ State agencies.

Liu, Higgins and Tan address how to analyze and redesign complex international supply-chain customs process that involves multiple government bodies and business entities in different countries for shipping time and temperature sensitive pharmaceutical products. They employ the e3-control methodology that is a model-based control procedure redesign methodology that combines value models and process models to provide complementary viewpoints. It involves four step analysis to derive a process redesign, including 1) a preliminary value analysis phase to understand the business model of the current situation, identifying actors, their value propositions and weak control points in the network that threatens the network sustainability; 2) detailed analysis for the identified weak control points; 3) development of revised business processes by adding or changing control mechanisms, with analysis of affected business value redistributions from the changes; and 4) evaluation of the implications of changes on the business model such as new values, network synergy and financial feasibility. This methodology has been applied to introduce a new supply chain solution for the temperature-sensitive, high-value pharmaceutical product

in cross-border trade from Ireland to the US, in the Drug Living Lab pilot study. They recommend a redesigned process that can foster the collaboration between government agencies and businesses, allowing businesses to be responsible for their own supply chains with simplified procedures and Customs administrations to be relieved from redundant control tasks and to focus their limited resources on other high-risk transactions.

Bertot, Jaeger, and Grimes explore transparency and accountability initiatives, and the ways in which Information and Communication Technologies are incorporated into them as a form of G2C collaboration. The paper includes an interesting review of the literature on the role of ICT to promote transparency and to reduce corruption, and an exploratory research on the current uses of social media as a tool in transparency initiatives. They found that Social Media can play an important role in promoting citizen participation, facilitating co-production of materials among people and between citizens and government, and crowdsourcing solutions and innovations. Additionally, authors conclude that Social Media has the potential of improving lines of communication in a way that ICT can favor not only those already in power, but also empowering the public to take a more active part on monitoring government actions.

PytlikZilllig, Tomkins, Herian, Hamm, and Abdel-Monem explore an important topic in public engagement in government issues on what are the factors that enhance the public's trust in government. Specifically, they investigate whether the engagement methods of getting the public's input, such as online survey, phone survey or face-to-face discussions, influence the degrees of the public's truct and confidence. They identify the factors to measure the trust and confidence, such as satisfaction, perceived trustworthiness, perceived legitimacy, and loyalty. The correlation analyses are used on the public engagement data collected using different input methods spanning over two years in a municipal government on the matter of budget and performance measures. The data analyses revealed that face-to-face input methods are associated with not only more confidence in government, but also greater perceptions that the government cares what residents think, and gives greater satisfaction, compared to phone surveys, even though persons who participate in face-to-face, online, or phone events differ both in extent of confidence and, to a small extent, in the bases of their confidence. The managers who are interested in the public's engagement can benefit on the findings of this study.

Evaluating the impact of eGovernment investments and policies through online services can be a complex task. Candiello, Albarelli and Cortesi addresses this very issue of how to measure and monitor perceived quality and impact of the online government services, service effectiveness and efficiency of systems that are implemented for online service. They propose a layered architecture of QoS monitoring: the impact analysis layer that measures the service satisfaction and impact for citizen facing services (called eGef layer), the process analysis layer that measures the quality of service of internal business workflow (called eQual layer), and the system monitoring layer that measures operations, performance and usage of eGovernment systems and services using key performance indicators (called eMon layer). They implemented a set of tools for these quality measurements and monitoring that provide satisfaction surveys and impact indicators webbots and periodically generate evaluation data on specific eGovernment online services. The multy-layer QoS evaluation architecture is implemented and used to monitor and measure the satisfaction and impact analysis for the citizen facing portal services (myPortal) as well as the government officials' portal services (myIntranet) in Regione Veneto local government in Italy. The

application of these QoS tools has proven to be useful in understanding the impact of online services, monitor key indicators, validate policies and rapidly react to expressed needs.

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