Collaborative Governance and Cross-Boundary Information Sharing: Envisioning a Networked and IT-Enabled Public Administration

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ABSTRACT

Governments around the world are moving toward a more global perspective in their efforts to address complex social, political, and economic issues. New requirements for international cross-boundary collaboration, driven by this global view, demand a new understanding about how individual nations respond to public problems and how nations work together in response to transnational problems. In addition, new forms of government enabled by information technologies and made possible through new models of collaboration are emerging. The future of public administration is clearly linked to the development and management of new forms of collaborative governance and the use of information technologies. Globalization is also contributing to the internationalization of the public sector, in which cross-boundary collaboration and information sharing will happen not only within a country, but between nations. This paper contributes to the exchange of knowledge about the future of public administration by presenting a view that considers important trends in public management and public service around the world. As a backdrop we first present a discussion about the emergence in public administration toward post-bureaucratic organizations and interorganizational networks. E-government and cross boundary information sharing are then introduced as part of the new context of public administration. We then draw the focus back to the importance of collaboration and information sharing in transnational public problems and international cooperation and characterize the need for new capability in working across the boundaries of organizations, governments, regions, and nations. Finally, drawing on this discussion we outline four topics of critical importance for inclusion in the public administration classroom to fully prepare students to work in the government of the 21st Century; Post-Bureaucracy and Organizational Networks, Information Technologies and Inter-organizational Information Integration, Collaborative Governance and Interoperability: Creating policy, management, and technology capability, and Transnational Problems and the Internationalization of Public Administration. The new generation of public administrators must understand the importance of collaborative governance, information technologies, and the internationalization of complex social problems for the public administration of the twenty first century.

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1. INTRODUCTION

Governments around the world are moving toward a more global perspective in their efforts to address complex social, political, and economic issues. New requirements for cross-boundary collaboration, driven by this global view, demand a new understanding about how individual nations respond to public problems and how nations work together in response to transnational problems. In addition, new forms of government enabled by information technologies and made possible through new models of cooperation and collaboration are emerging. The future of public administration is clearly linked to the development and management of collaborative governance and the use of information technologies to support coordination inside these networks of organizations. This global perspective is also contributing to the internationalization of the public sector, in which cross-boundary collaboration and information sharing will happen not only within a country, but between nations.

The growing support for cross-boundary collaboration and information sharing transcends political partisanship and crosses multiple policy areas. It crosses continents, oceans, political ideologies, and institutions. This support stems from an increased understanding of the potential public value of the capability to collaborate and share information in new ways to meet the priorities of government; tracking the spread of disease across regions, paying health benefits to workers who live and work in different countries, fighting crime, and monitoring air quality in border regions, among many others. Collaborative governance and information sharing as priorities are gaining support as a consequence of a new understanding of the cost to society when these systems are not in place. The 2004 bipartisan *9/11 Commission Report,* for example, presented a sobering characterization of the U.S. public sector's current ability to leverage information. It emphasized that a weak system for processing and using information is stymieing the U.S. government's ability in leveraging the vast amount of information it has access to.[1]

Internet technologies and standards, networks, databases, data warehouses, and business intelligence applications provide the technical basis for information sharing as a strategy for responding to complex problems. However, insights from this and other experiences and the growing concerns about global health crises have pushed collaborative governance and information sharing, rather than technology, to the center of the debate about preparation for the next pandemic. At a November 2007 meeting of the World Health Organization, interoperability and transparency were identified as "essential" to the efforts of the member countries to "increase country capacity in surveillance, early detection, diagnosis and reporting of cases – both animal and human." The cost of not being prepared to share information, to coordinate international responses, and to work together, is well understood, "If we are unprepared the next pandemic will cause incalculable human misery."[2]

[1] National Commission on Terrorist Attacks on the United States *The 9/11 Commission Report* (Washington, D.C.: July 2004).

[2] Jong-wook, L. (November 7, 2005). *Meeting on avian influenza and pandemic human influenza: Opening remarks*. Geneva, Switzerland: World Health Organization.

Within the context of these emerging complex global and regional problems, a networked and IT-enabled public administration emerges not only as a possible vision for a prepared public administration of the future, but a necessary one. To be prepared we must understand how information is shared among government and non-governmental organizations as they come together in collaboratively governed national and international networks to provide public services and solve complex public problems. The new generation of public servants, in particular, must understand the changing landscape of society and of the new and emerging complexity underlying the traditional role of the public administrator. They must understand the tensions between traditional bureaucratic organizations and emerging network forms of organizations as sometimes competing and sometimes complementary mechanisms for carrying out the role of government and become facile working within these tensions. They must understand the need for and power of collaborative approaches and the important role of information and technology in both creating conditions for collaboration and as the object of multi-organizations collaborative efforts. Overall, they must learn anew what capabilities must exist within networks of organizations to ensure that government programs serve citizens effectively within this evolving context.

This paper contributes to this new understanding by highlighting these concepts and capabilities and arguing that the future of public administration is and will be clearly influenced by them. As a backdrop we first present a discussion about the emergence in public administration toward post-bureaucratic organizations and interorganizational networks. E-government and cross boundary information sharing are then introduced as part of the new context of public administration. This section includes a summary of a current effort to develop an empirically grounded definition of inter-organizational information integration. These definitions draw generally from the concept of interorganizational networks and information integration and begin to outline the critical components of collaborative governance and information sharing through interoperable systems as core capabilities of the public administration of the 21st century. More specific descriptions of these two important elements of interorganizational information integration: collaborative governance and interoperability are then provided. We then draw the focus back to the importance of collaboration and information sharing in transnational public problems and international cooperation and characterize the need for new capability in working across the boundaries of organizations, governments, regions, and nations. Finally, drawing on this discussion we outline four topics of critical importance for inclusion in the public administration classroom to fully prepare students to work in the government of the 21st Century.

2. POST-BUREAUCRATIC ORGANIZATIONS AND INTER-ORGANIZATIONAL NETWORKS

Traditional hierarchies, as described by Weber (1922) almost a century ago, are increasingly challenged by the new and complex public problems of the 21st century. This section draws on the writings of a number of the scholars who have contributed to the discussion about the emergence of inter-organizational networks in the public sector as a mechanisms for responding to these challenges. Many of these scholars speak to the new kinds of complex social problems

facing governments and how responses to those problems requires collaboration from different levels of government, private organizations and non-profits (W.M. Snyder & de Souza Briggs, 2003; W. M. Snyder *et al.*, 2004). These new collaboration patterns challenge the traditional hierarchical government organization, creating new pressure to innovate in the structure of institutions (Gascó, 2004). They challenge government managers and researchers alike to understand in a new way the creation of networks of public and/or private organizations who need to share what they know about a specific problem domain (Fountain, 2001a; W.M. Snyder & de Souza Briggs, 2003; Zhang *et al.*, 2002) and to work together in new ways to respond to those new problems. New pressure from citizens who demand levels of service they are familiar with from the private sector is also driving government to organize and operate in new and innovative ways (Kannabiran *et al.*, 2004). Additionally, movements such as the New Public Management or the Reinvention of Government are also adding pressure to improve these levels of service (Fountain, 2001b).

Working across the boundaries of organizations, sharing information and resources, to address these new problems in more collaborative ways has been found to be an effective strategy for meeting government priorities. Many of the services traditionally provided by single government agencies are now the responsibility of complex inter-organizational networks, which sometimes include numerous government agencies, as well as non-profit and private sector entities. This network form of organization has been defined as "any collection of actors ($N \geq 2$) that pursue repeated, enduring exchange relations with one another and, at the same time, lack a legitimate organizational authority to arbitrate and resolve disputes that may arise during the exchange" (Podolny & Page, 1998, p.59). Networks can be considered as an intermediate or hybrid form of organization between decentralized markets and centralized hierarchies, or rather as separate, different organizational model that is neither a market transaction nor a hierarchical firm (Powell, 1990). There are many other terms describing this form of organization such as adhocracy, alliance capitalism, agile enterprise, cluster, joint venture, meta-corporation, modular corporation, Moebius-strip organization, organic organization, small-firm network, value adding partnership, and virtual corporation (Alstyne, 1997, p.84).

The distinction between market, hierarchy, and network originated in the field of transaction cost economics. Ronald Coase (1937) was the first economist who distinguished hierarchy-based firms from the price mechanism of markets. From this approach, transaction costs constitute a key element to determine profitability and thus selecting between doing business through a hierarchical firm or market mechanisms (Coase, 1937). Moreover, hierarchically organized firms replace market exchange if transaction costs are high due to uncertainty, repetitive tasks, and substantial transaction-specific investments that are not easily transferable (Williamson, 1975).

The concept of network organization was introduced as an alternative form of economic organization different from market and hierarchy by Powell (1990). According to Powell, networks are organizations based on relationships, mutual dependency, and norms of reciprocity. These characteristics make them different from markets, which rely on contracts and the price mechanism as means of communication, and hierarchies, which emphasize employment relationships and routines. Markets are a remarkable device for fast, simple communication, while hierarchies provide reliability and accountability, and are well-suited for mass production and distribution. Since the relational features of networks greatly enhance the ability to transmit

and learn new knowledge, network organizations are particularly apt for circumstances that require efficient, reliable information and for the exchange of commodities of which value cannot be easily measured. These relational features are central to the sharing of both knowledge about a specific policy domain, such as public health. For example, to effectively respond to the emergence of West Nile Virus most states in the US had to create new networks of organizations to work collaboratively and to share information both about the disease itself and about how each entity would work as part of the network response effort. A new emphasis on networks and understanding the role they play in the context of complex issues such as biosurveillance is necessary to prepare public administrators for working in the 21st century.

Although born in the field of economics, the concept of network has been adopted in other fields such as sociology, management, political science, law, and computer science. The study of networks, a relatively new one in public administration has two traditions (Considine & Lewis, 1999). The first emerged in the policy studies literature and focuses on collaboration among bureaucrats, interest groups, and target populations for effective policy formulation and implementation. The second tradition, found primarily in the organizational studies literature, investigates the use of non-hierarchical, non-market forms of organization in the public sector as an alternative to the traditional bureaucracy. Similar to other academic traditions, this second viewpoint highlights unique characteristics of network organizations compared to hierarchical organizations.

As mentioned above, networks are becoming important for public management given that the delivery and management of public services increasingly relies on complex networks of interdependent organizations (O'Toole, 1997). Considine and Lewis (2003; 1999) consider network governance as an alternative to procedural bureaucracy. They claim that network governance is characterized by rationality based on a shared organizational culture, co-production of service by clients, suppliers, and producers, flexible organizational structure, and services tailored to the need of individual clients. Networks constitute a particularly emergent structure in complex policy fields such as AIDS, pollution control, and city management.

In managerial terms, a network organization can be defined as "a loose federation of informally constituted, self-managing, often temporary, work units or teams within which there is a fluid division of labor and which are coordinated through an internal market, rather than rules, and horizontal negotiation and collaboration, rather than hierarchy" (Halal, 1994, p.69). The traditional view of a manager's role is changing as well following these changes in organizational forms, focusing less on command and control and more on facilitation and coordination. In network forms of organizations, managers engage in team leadership, negotiating integrated efforts across boundaries, inspiring and promoting organizational learning, and conceiving and facilitating change (Hales, 2002, p.55).

Four new kinds of tasks for managers within public networks have been identified: activating, framing, mobilizing, and synthesizing (Agranoff, & McGuire, 2001). Activating consists of identifying participants and stakeholders in the network. The process of framing establishes and influences the operating rules of the network. Mobilizing induces individuals to make a commitment to the network. Finally, synthesizing is the enhancement of conditions for favorable, productive interaction among network participants.

Managerial roles as well as authority for decision making are not necessarily possessed by individuals who hold formal managerial positions, but they can be assumed by different stakeholders belonging to the network. In fact, the power of managers comes not only from their formal positions in a hierarchy but also their personal character, expertise, and networking (Quinn *et al.*, 2003, p.261-270). Network power, also known as social capital, is obtained through the knowledge and influence of people who know and trust a manager and is becoming increasingly vital in contemporary organizations as their external environment becomes complex. In this context, an individual needs to act as a "broker" whose role is to build and maintain a network, to negotiate agreement and commitment, and to present new ideas. Network centrality constitutes another important structural source of power in organization (Ibarra, 1993, p. 476-477). This type of power comes from holding a central position within emergent networks of relationships, rather than from a position formally defined hierarchy.

3. INFORMATION TECHNOLOGIES AND CROSS-BOUNDARY INFORMATION INTEGRATION

Some of the most promising benefits from the use of information and communication technologies (ICTs) in government are associated with supporting the operation of network forms of organization and the new ways of collaborating that it requires to solve current complex social problems through the integration of information across organizational boundaries (Caffrey, 1998; Cresswell *et al.*, 2004; Cresswell *et al.*, 2002; Dawes, 1996; Dawes & Pardo, 2002;. Gil-Garcia *et al.*, 2005). In this way, inter-organizational information integration has become a priority in many public programs and services. This central role of information and communications technologies in the formation and operation of government programs and services, and in particular in network forms of government, requires public administrators to begin understand more fully the nature of that role. More recently this use of information technologies in government or what some called "electronic government" has become a prominent strategy for government administrative reform (Fountain, 2001a; Heeks, 1999; Kraemer & King, 2003). E-government projects can potentially generate a series of benefits such as increase the quality of government services, generate financial savings, and improve the effectiveness of government policies and programs (Gant *et al.*, 2002; Garson, 2004; Holmes, 2001; Landsbergen & Wolken, 2001). However, one of the main challenges still is to fully understand how to conceptualize e-government (Gil-García & Luna-Reyes, 2006; Grönlund, 2005; Prins, 2001; Schelin, 2003). A rich variety of electronic government definitions can be found in the existing literature. It is possible to summarize most of the current definitions of electronic government using five basic elements. Electronic government is characterized by: (1) the use of ICTs (computer networks, Internet, faxes and telephones); (2) the support of governmental actions (provide information, services, products, administration); (3) the improvement of governmental relationships with citizens (through creation of new communication channels or the promotion of citizen engagement in the political or administrative process); (4) the following of a strategy oriented to add value to the participants in the process; and (5) IT-enabled government transformation (Gil-García & Luna-Reyes, 2006).

Enterprise-wide views in both public and private sectors as well as technological developments such as the World Wide Web, data warehousing, geographic information systems (GIS), and the Extensible Markup Language (XML) are technological trends promoting inter-organizational information integration (Rocheleau, 2006). Inter-organizational information sharing and integration has become an important topic to public managers and leadership (National Association of State Information Resource Executives, 2000; Pardo *et al.*, 2008; Rocheleau, 2006). While private firms share their information to maximize profits and to improve their competitive position, public sector organizations need for information sharing does not respond directly to competition, but to several factors, such as the complexity of the problems being faced by government, the emergence of new organizational forms such as networks, pressure to improve service to the citizens or the need to learn about new information technology (IT). In this way, all different trends discussed so far are intertwined in a series of reinforcing processes pushing a growing pattern in most of them. However, there is a need for better understanding of this phenomenon (Scholl & Klischewski, 2007).

Information sharing and information integration have often been considered as closely related but distinct concepts (Gil-Garcia *et al.*, 2008). While "information sharing" is the transference of information from one agency to another, "information integration" is a more complex process which involves data contribution by agencies to a common data network for use by multiple agencies and individuals (International Association of Chiefs of Police, 2000; U.S. Department of Justice, 2003). In many senses, information integration not only involves the transference of information, but a translation and transformation of information preparing it for new, joint uses (Carlile, 2004). Both concepts (information sharing and information integration) converge when an integrated information system provides more comprehensive data sources shared among contributors (International Association of Chiefs of Police, 2000; U.S. Department of Justice, 2003).

The capability to share information across boundaries has become "one of the basic goals of modern information management in government" (Rocheleau, 2006, p.308). Efforts to share and/or integrate information have been made in various fields such as GIS (Bamberger, 1995; Landkamer, 2003), park management (U.S. General Services Administration: Office of Intergovernmental Solutions, 2002), human services (U.S. General Accounting Office, 2002), health care (Stampiglia, 1997), homeland security (*Domestic security measures*, 1984; Relyea & Seifert, 2005), and criminal justice (Gil-Garcia et al., 2005; National Association of State Chief Information Officers, 2003; Roberts, 2004).

In recent years, increasing research attention has been paid to information sharing across multiple government agencies found to be central to these problem solving strategies; in particular the role information and communication technologies (e.g. the Internet) literature (Scholl & Klischewski, 2007). This research regularly emphasizes that the effectiveness of inter-organizational information exchanges depends on the interplay of several technology and non-technology related factors—e.g. quality of the organizational and technological structures that support information sharing, policy environment, level of jurisdictional authority to promote integration and interoperation among agencies, among others (Caffrey, 1998, Dawes & Pardo, 2002, Gil-Garcia et.al, 2007, and Scholl, 2005)

In the border regions of the three countries of North America, economic, political, cultural and social differences create a complex environment for collaboration and information sharing. Distinctive legislation, issues of sovereignty, language barriers, different working environments and conditions as well as unique policies regarding access to information are among a few of the many factors that contribute to this complexity (Brunet-Jailly, 2006, Roy, 2005 & 2006). To ensure that information can be effectively shared, governments require high levels of interoperability of policy, management and technology systems including standardization. Increasingly agreements between the countries make specific the kinds of information that will be shared and how that information will be used . Border control, as an example, is an area where much attention is paid to these issues both by practitioners and researchers. Border control is complex and deeply institutional, and requires a high level of capability for information sharing. But capability for information sharing within border regions is also critical in a number of other policy domains such as public health and environmental management. In these domains information sharing and collaboration across borders in can be more complex due to the involvement of many more actors within the border regions. State or provincial governments are certainly involved, but so are local governments and other non-governmental organizations working at the local and state or provincial level.

In spite of the increasing interest on inter-organizational information integration, there have been relatively few systematic studies investigating this phenomenon in the public sector (Gil-Garcia et al., 2008). In fact, “despite the widespread interest regarding the topic, integration continues to be poorly conceptualized” (Barki & Pinsonneault, 2002, p.5) and the term integrated information systems “means different things to different people in different contexts” (Harris, 2000, p.7-8). This is perhaps due to the nature of information integration and sharing efforts as an emerging process that is dynamic and multifaceted in nature and involves fundamental changes in business practices and various legal and policy issues (Roberts, 2004). The term “integration” has been used in both technical and non-technical treatments of the concept and used interchangeably with other terms such as “interoperation” and “interoperability” in e-government literature (Scholl & Klischewski, 2007). Scholl and Klischewski (2007) establish that a clear distinction among these terms would enhance the clarity of the discourse in this field.

One way to think about integration is to focus on its social aspects, specifically on information sharing among individuals and organizations (Gil-Garcia et al., 2008). Davenport and Prusak (1997) define information sharing as “the voluntary act of making information available to others” (p.87). According to a research report by the then National Association of State Information Resource Executives (2000)—now the National Association of State Chief Information Officers—governmental information sharing involves the transfer of information from a holder entity that is willing, able, and entitled to provide the information to a receiver entity that is able to demonstrate the need for the information, is able to receive it, and agrees to abide by usage rules set by the holder. Such sharing relationships are generally based on mutual trust which alleviates conflicts and reduces transaction costs and risks between information sharing entities (Dirks & Ferrin, 2001; Lane & Bachmann, 1998; Thompson, 2003). The most common case in the public sector is information transfer between two government agencies, however, holder and receiver entities can also be governmental units, for-profit organizations, nonprofit organizations, or individuals.

Other researchers focus on the technical aspects of information integration (Gil-Garcia et al., 2008). Jhingran, Mattos, and Pirahesh (2002) propose that information integration is a process wherein "complementary data are either physically or logically brought together, making it possible for applications to be written to and make use of all the relevant data in the enterprise, even if the data are not directly under their control" (p.555). The integration of two systems requires a detailed standard format for all constituent components which is agreed by all parties (Chen *et al.*, 2008; International Organization for Standardization, 1999). A closely related terminology with emphasis on technical aspects is "interoperability." Interoperability can be defined as "the ability of two or more systems or components to exchange information and to use the information that has been exchanged" (Institute of Electrical and Electronics Engineers, 1990). Information systems interoperability can be further divided into two different types: "syntactic interoperability" that allows multiple software components with different languages, interfaces, and platforms to cooperate at the application level and "semantic interoperability" that provides the ability to bridge semantic conflicts resulting from differences in implicit meanings, perspectives, and assumptions at the knowledge level (Park & Ram, 2004). As suggested by Carlile (2002), we can add a third type of interoperability at the "pragmatic" level, which promotes the transformation of local practices, the interoperability of processes, and the development of new applications from shared information resources.

Finally, a few scholars recognize the socio-technical nature of information sharing (Gil-Garcia et al., 2008). Integration results from cooperation, a common cross-organizational strategy and its implementation, and interoperability, the technical means which enable information technology (IT) systems to exchange messages across system borders (Klischewski, 2004). Similarly, information sharing systems acceptance is "the level of provision of proprietary information to relevant external parties through information systems" (Lee & Rao, 2007, p.2). They examine inter-organizational information sharing systems in public sector organizations in terms of socio-technical factors such as information assurance of information sharing partners, sensitivity of shared information, organizational norms of interagency information sharing, and IT infrastructure.

4. COLLABORATIVE GOVERNANCE AND INTEROPERABILITY

As mentioned in the previous section, inter-organizational information integration is a socio-technical phenomenon encompassing managerial, policy, and technical aspects. Two of the most important foundations for cross-boundary information sharing and integration in government are collaborative governance and interoperability. Collaborative governance provides an inter-organizational structure to make decisions and coordinate efforts across organizational boundaries. Interoperability allows multiple government agencies to share information resources under the same standards and potentially the same infrastructure. Technical advances make interoperability possible, but research and practical experience tell us that technology alone cannot solve the challenges of creating interoperability. The complexity of creating enterprise interoperability lies in the interdependence among policy, management and technology capabilities and the gaps between the levels of capabilities required within an enterprise and the capabilities that exist. The broad view used here considers capability in terms of two closely

related, but distinct components needed for creating new multi-organizational interoperable systems:

1) Capability to create effective collaboration across organizational and governmental boundaries
2) Capability to develop new interoperable systems and procedures.

Making a distinction between sets of capabilities is critical to understanding the complexity common to many transformative efforts. The first component, collaboration capability, is about working together and making plans and decisions in new ways. This seemingly simple capability is often found to be lacking. Collaboration at the individual level, even at the unit and agency level is often within the skills and authority of government mangers to arrange. However, creating capability for collaboration in within the public health enterprise of a country, or across country lines to create regional programs, requires the unique attention and authority of government leaders.

For example, in 2004, Oregon was one of the last remaining U.S. states to experience human cases of the West Nile Virus that began in North America in the late 1990s. Interoperability was a central part of the response coordination effort and required new levels of interoperability within the state and with federal agencies. One county-level communicable disease expert involved in West Nile Virus response efforts found that for agencies to achieve interoperability on a more systemic and institutional level, they must understand each other's missions and needs. To achieve this level of understanding, she said, agencies go through several stages of collaboration. The first stage is "shake hands." Meet and get to know the people from agencies you will be working with. The second stage is to coordinate planning and training with agencies through exercises and routine responses. Only after going through these first two stages can agencies reach the stage of true interoperability. Building this collaboration capacity takes time and resources, and only through legislative and executive support can individual agencies begin to work through the first two stages and be prepared for interoperability when and where it's needed.

The second component contributes to the building of systems and inter-organizational processes used to share and integrate information. Leadership involvement is required here as well. Creating new interoperable business processes and information systems builds on new agreements about how work will be done to actually create interoperable systems. This typically requires resources to be managed in new ways. New resource allocation and procurement strategies are necessary and as a consequence operating agencies, control agencies and policy making bodies must also act in new ways.

Oregon, like many other governments, acknowledges the two categories of capability for interoperability. However, creating this capability within complex enterprises is constrained by many factors including technical issues such as data and technical incompatibility. But institutional and organizational factors present their own constraints on the ability of governments to create effective collaboration across organizational boundaries. These include:

1. A lack of experience leading in network forms of government

2. Insufficient or lacking cross-boundary governance structure
3. A lack of policies that allow new, innovative resource allocation models
4. A lack of policies that engender investments in the principles of scalability and sustainability of solutions
5. A focus on crisis-oriented response.

The following sections elaborate on the importance of collaborative governance and interoperability for effective inter-organizational collaboration and information sharing in a networked public administration.

4.1. Collaborative Governance

As the delivery and management of public services increasingly rely on complex networks of interdependent organizations and the nature of governmental work changes from labor-based production and services to knowledge-based tasks, network governance is becoming increasingly important for public management (Agranoff & McGuire, 2003; O'Toole, 1997). However, there is little research about the determinants and characteristics of an effective governance structure in multi-organizational settings.

Recent research highlights the policy, management, and technological changes required to create the high-functioning, cross-boundary capability necessary for cross-boundary information sharing as among the most complex, deep functional and institutional changes (Cook, 2004; Fountain, 2001a). Main challenges to create this capability have been described ranging from technological in nature such as data and technical incompatibility to more social in nature such as the lack of institutional incentives to collaborate and the power struggles around multi-organizational settings (Gil-Garcia & Pardo, 2005). Six determinants of the existence and effectiveness of a collaborative governance structure have been identified as: (1) knowledge of information needs, (2) knowledge of the environment, (3) willingness to accommodate to the diversity of participating organizations and their goals, (4) knowledge about participating organizations, (5) existing legislation, and (6) executive involvement (Pardo et al., 2008).

Different country contexts have been found to pose some additional challenges for information integration initiatives (Luna-Reyes *et al.*, 2007). For instance, the Latin American institutional environment poses particular challenges for collaboration and integration, given that the state is perceived as a group of loosely coupled agencies with poorly compensated and unmotivated personnel at the lower levels, and politicians who are more interested in their own benefit at the upper levels (Gascó, 2004). Additionally, the existence of other related inequalities triggers fierce discussions about the social benefit of investments in digital government compared to investments in other social programs.

Collaboration must be institutionalized as a principle and facilitated as a management strategy within our traditional bureaucratic institutions as well as within our networks. Unfortunately, while leaders have the unique power to make these changes, experience shows that the policy environments they have created, or in many cases inherited, often limit the capability of governments to share authority, to collaborate and to jointly and strategically manage enterprise-wide initiatives. To change this, government executives must understand the link between their policy decisions and the capability of governments to create the systems necessary to share

information across boundaries. The government of the future must have the capability to engage in collaborative efforts including decision making and to share information across borders, jurisdictions, agencies and sectors.

4.2. Enterprise-wide Interoperability

Interoperability is a capability allows for the creation of connected systems that facilitate better decision-making, better coordination of government programs, enhanced services to citizens and businesses, and the one-stop delivery of services through a variety of channels. Interoperability is a key enabler of the information and knowledge sharing necessary for ICTs to deliver on the promise of government transformation and the foundation of a citizen-centric society. Interoperability is not an end by itself; interoperable systems deliver value to the public through the opportunities they enable. Value is realized through better coordination and through new information uses for decision, strategy and policy making. The following list provides some examples in which interoperable systems can contribute to the creation of public value.

Democracy and Citizen Participation

- Access to information for engaging in political action activities such as advocating, debating, and voting.
- Creation of new electronic forums for citizen engagement.

Transparency and Trust

- Access to integrated, holistic views of government resources and operations contribute to transparency and citizen trust in and allegiance to government.
- Access to information about government processes for public scrutiny influences decision makers and other officials to pay closer attention to public interests and desires.

Citizen and Business Services

- Information about benefits and services available to citizens that they would otherwise be unaware of or unable to acquire.
- Easy to use, accessible, and geographically distributed citizen and business services (multi-channel access to payment services and applications and forms).
- Facilitate the connecting of citizens and businesses into the global economy.
- Facilitating the creation of consumer-producer networks and alternative, more sustainable markets such as Fair-trade.

Government Management and Economic Development

- Internal, modernized infrastructure for government operations to support the back office processing of citizen and business services.
- Make government much more capable in financial, human resources, and equipment management to support government decision-making, wise use of resources, and provide information for financial transparency and accountability.
- Improved government-wide coordination of crisis responses.

Government Long-Term Strategy and Policy Making

- Consolidated databases and data warehouses provide strategic information to support strategic planning and policy making in government.
- Stimulate local, regional, and national economies by attracting investments through enhanced reputation for improved government operations and new and innovative services available to citizens and businesses.
- Geographic Information Systems play a key role in the strategy and policy process particularly at the regional and local levels.

Although interoperability is a problem itself inside individual agencies, we refer in this paper to interoperability across organizational boundaries. Agency leaders are often well versed in creating the necessary environment to build interoperable systems within their organizations. However, cross-agency interoperability requires the kind of leadership and authority only available at the top most levels of governments, particularly when the goal is to create interoperable systems across government levels or even across national boundaries. The reason for this has much to do with the number and diversity of the organizations that need to become interoperable. We refer to this distinct and interdependent group of organizations as an "enterprise." For example, linking two databases and case management processes within a single social services agency within a single government requires one set of capabilities. Creating a public safety communications network consisting of many different agencies at several levels of government, even across national boundaries, with different, but overlapping business processes using similar, but not standardized information, requires quite a different set. An enterprise could be defined as a network of organizations that share either a policy area (e.g., public health, public safety, poverty alleviation, and economic development) or need to provide services (e.g., government procurement and financial management, health services, and the administration of justice) that no single agency or organization provides alone or exclusively. While public sector officials at all levels of government play important roles in a wide range of interoperability efforts, government leaders alone have the power to alleviate the institutional constraints that impede these potentially transformative, but highly complex enterprise-wide interoperability initiatives. For example, a direct mandate from President Fox in Mexico in 2000 constituted a key enabler of the e-Mexico initiative and the collaboration of a diversity of government agencies, private organizations and NGOs.

5. CROSS-BOUNDARY COLLABORATION AND INFORMATION SHARING AS NEW CORE CAPABILITIES FOR GOVERNMENT

Information is one of the most valuable resources of government. Governments are finding, however, that the information needed to plan, make decisions, and act is often held outside their own organizations, collected for widely different purposes and maintained in disparate formats and systems. This is why governments are increasingly turning to cross-boundary governance and interoperability as strategies for maximizing the value of information. Governance provides ways to coordinate and make decisions in multi-organizational settings such as networks of government agencies. Interoperability allows government managers to work at the same time, with the same information integrated from multiple sources. It has the potential to support the transformation of organizational structures and communication channels among numerous

agencies working in different locations. Globalization contributes to this situation by presenting some social problems as transnational in nature and posing international cooperation as the best strategy for dealing with them. Government cross-boundary collaboration and information sharing have a great potential in this environment.

The growing support for interoperability as an infrastructure investment transcends political partisanship and crosses policy areas and institutions as well as continents and oceans. This support stems from an increased understanding of the potential public value of more effective interoperability. Interoperability capabilities, when available, allow information to be shared and used in new ways to meet the priorities of government; to track the spread of disease across regions, to pay health benefits to workers who live and work in different countries, and to monitor air quality in border regions. The following case vignettes are provided to illustrate how collaborative governance efforts have facilitated the creation of the interoperable systems necessary to share information and to respond to public problems in new ways.

Increasing the legitimacy of government through transparency and efficiency. Financial management systems are key links in the flow of revenues to the government and the flow of expenditures and services back to the public. Improving financial management, therefore, has the potential to produce significant returns in terms of both greater internal efficiencies and enhanced value to the public. These were the goals of the Austrian Federal Budgeting and Bookkeeping System project initiated in 1997 by the Minister of Finance and supported by the Chancellor. The goal of the project was an interoperable federal government budget and bookkeeping processes. By 2005, one of the results of the interoperability initiative was that the Ministry of Finance successfully consolidated 85 bookkeeping units across the federal government into one federally owned, but privately operated, agency. These improvements reduce the burden of financial support on the public—taxes, fees, etc.—and can ease the burden of compliance with rules and policies. Better financial information can make government budgets and expenditures more transparent, and thus more legitimate and acceptable to the public.

Increasing the value of government to citizens through enhanced services. Canada's Service New Brunswick (SNB) is well-known internationally for its expertise in providing multi-channel single window citizen access to government services, as well as for developing and maintaining geographic information databases. SNB's award-winning approach provides one-stop-shopping for different government services on behalf of provincial and municipal government agencies. It also provides a linkage to the Canadian Federal Government in a joined-up government model. As a crown corporation operating outside of, but in partnership with Canadian governments, SNB was to create new models for sharing resources and managing programs.

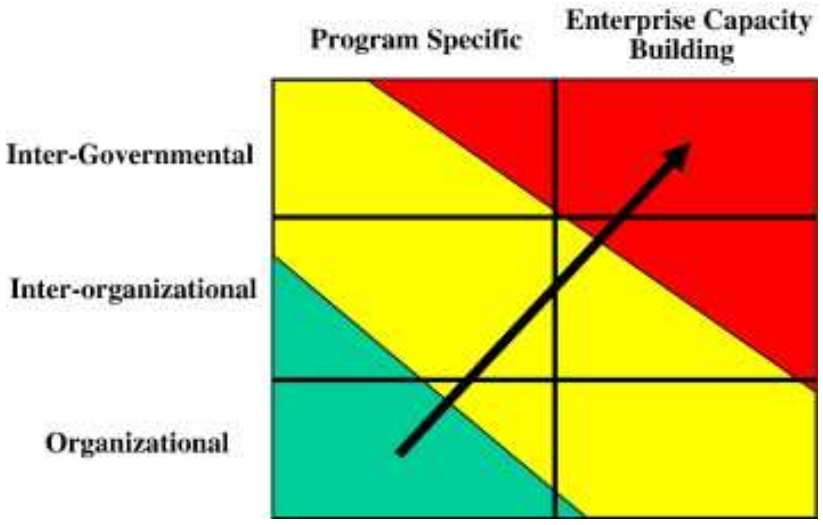
Transforming government through modernized, integrated, and world-class practices. The Merkava Project in the Government of Israel restructured the financial, logistics, and human resource components of government-wide administration into an interoperable system. An interoperability framework was used as way to implement a much more standardized and modernized government operation and an enhanced management infrastructure on which to build improved services.

Transforming government health services through integrated medical records. Health services in Mexico are provided to the population by two large systems of clinics and hospitals, IMSS and ISSSTE. The first of them provides services to insured employees in the private sector, and the second one offers services to government employees. In collaboration with these two important health systems, some private hospitals and higher education institutions, the Ministry of Health has been working in a project to create a Single Electronic Medical Record. The project has involved the development of systems and standards for health records to support hospital and drug administration. Although in its initial stages, initial systems have improved in an important way the service provided to the users of the public health system, and they have developed a proposed standard for interoperability among the two main public systems. Consolidated information is envisioned to serve the strategic needs of public managers by identifying health problems and trends in the Country.

Interoperability as a priority is also gaining support as a consequence of new understanding of the cost to society when interoperable systems are not in place. This new understanding has come through the examinations of several national and international crises that required governments to coordinate and work together both within and across governmental boundaries and with civil society organizations and the private sector. A post-tsunami lessons learned report released by the Government of Indonesia and the United Nations[3] noted the many missed opportunities for coordinated response among national and international responders. The consequence of this was a myriad of coordination problems resulting in each responder providing what they could based on an internal setting of priorities rather than a shared understanding of needs.

The *Information Sharing Complexity Matrix* (Gil-Garcia et al., 2005) provides a mechanism for characterizing a cross-boundary interoperability initiative and identifying the level of complexity to be expected in creating interoperability and information sharing capability. The first dimension refers to the focus of the initiative, which can be meeting a specific need or problem or building systemic capacity. The second dimension takes into consideration the associated level of organizational involvement with three categories of involvement: intra-organizational, inter-organizational, and inter-governmental.

[3] Post-Tsunami Lessons Learned and Best Practices Workshop; Report and Working Groups Output, Jakarta, Indonesia, May 2005, Government of Indonesia, United Nations.



Information Sharing Complexity Matrix

Source: Gil-Garcia, et. al, 2005.

From a global and local perspective we know the future presents many challenges. The president of an association of U.S. local government health officials, speaking before U. S. State Legislators in early 2004, testified that "while we can't predict future challenges, we know they will be there. We know they will be difficult, surprising in complexity, and growing in frequency and severity." He emphasized that the infrastructure of local public health units needs to be further strengthened to meet the increasing challenges and emerging public health responsibilities in our communities. Information must be shared in new ways and systems must work together at new levels.

6. FOUR TOPICS OF CRITICAL IMPORTANCE FOR THE PUBLIC ADMINSTRATION STUDENT OF THE 21ST CENTURY

Working through collaborative mechanisms across networks of organizations to create a policy, management and technology infrastructure that enables governments to work together and with other organizations in the interests of citizens is the challenge that lays ahead of the public administration professional of the 21st century. A quote from a U.S. Local Government Public Health Official characterizes the challenge in this way, "While we can't predict future challenges, we know they will be there. We know they will be difficult, surprising in complexity, and growing in frequency and severity." To be prepared to deal with these challenges, we argue, students of public administration must examine the tensions between traditional bureaucratic

organizations and emerging network forms of organizations. Tensions which emerge as the two forms come together; as sometimes competing and sometimes complementary mechanisms for carrying out the role of government. Students must understand the need for and power of collaborative approaches within this context and the important role of information and technology in both creating conditions for collaboration and as the object of multi-organizational collaborative efforts. They must understand what capabilities must exist within government and in government partners when operating as a hierarchy or as a network to ensure that they are effectively leveraging information and information technology to serve citizens within this new and evolving context. The following sub-sections outline four topics of critical importance for inclusion in the public administration classroom if we are to fully prepare students to work in the government of the 21st Century.

6.1. Post-Bureaucracy and Organizational Networks

Public administration students must learn how to understand and operate within the new inter-organizational environment of the public sector. To fuel this effort we must first develop more understanding about this emerging form, and in particular how networks and hierarchies work together in the government context. More research examining networks in the context of government and in particular, how networks and hierarchies work together in carrying out both traditional service delivery in new and innovative ways but also in leveraging networks and hierarchies in the context of more complex and geographically, rather than jurisdictionally oriented, issues such as public health and emergency response is needed. Case studies which highlight the role of networks across a range of policy domains and levels of government are necessary. These case studies should highlight the challenges of network formation and operation, in particular as it relates to creating new governance capability. They could be used to illustrate the role of public policy in enabling and constraining the ability of governance agencies to operate fully as network organizations. For example, current resource allocation models tend to limit the ability of networks to share or blend resources toward a common interest. Further, case studies could be used to show the critical and shifting role of executive authority and leadership in network forms of organizations. Cases from across policy domains such as public health, emergency response, and human services, would illustrate how some of the characteristics of network formation and operation are universal, others are context specific. Student must understand the differences and be prepared to work within each form as well as to bridge them.

6.2. Information Technologies and Inter-organizational Information Integration

The complexity government agencies face in creating interoperability to support information sharing across the boundaries of organizations appears to increase proportionally with the number of boundaries crossed, the number and type of information resources to be shared, and the number of technical and organizational processes to be changed or integrated increases. To create an IT enabled public administration capable of sharing information across boundaries in support of public programs and priorities, students of public administration must be exposed to these complexities and to the dynamic nature of the conditions which create these complexities. The capabilities of any network to be successful in creating interoperable systems in support of information sharing depends on the collective and complementary capabilities of the involved organizations. How networks of organizations individually and collectively manage their technology and information resources matters. Students of public administration must be aware

of the issues of information technology investment decision making and planning, they must be aware of the mechanisms through which these decisions are made. These decisions impact all aspects of government programs; they are not just "IT decisions". Students must understand the complexity of cross-boundary information sharing, the opportunities created by technology innovations, as well as the factors which determine the capability of government agencies to effectively deploy a technology infrastructure that enables information sharing and integration.

6.3. Collaborative Governance and Interoperability: Creating policy, management, and technology capability

The distinctions outlined above between capabilities are critical to understanding the complexity common to many collaborative governance and interoperability efforts. Students of public administration must be exposed to the concepts of collaborative governance if they are to be effective operating within networks as well as creating the conditions in which networks will succeed; in particular, the policy, management and technology conditions. Organizations that are highly capable in terms of collaborating and communicating may have limited capability in terms of their information policy and technology expertise. Orienting students to the potential complementary roles that organizations can play in building information sharing capability and learning to identify and leverage those strengths, is necessary. Factors that influence the success of governance within networks and how those factors might be contrary to or complementary to traditional structures is necessary. Research and case studies outlining the dynamic and complementary nature of capability within networks as a backdrop for creating collaborative governance can provide a foundation of knowledge here. Creating an IT-enabled public administration requires attention to the value of information sharing and collaboration and to the capability of individual actors and organizations to contribute to that value creation process. Students must be exposed anew to questions of public value and mechanisms for identifying sources of value within the context of interorganizational information sharing networks and monitoring those sources for actual value. Collaborative governance and information sharing come at a high price; they are time and resource intensive, if value is not being delivered through the investments being made in management, policy, and technology capabilities, then this same governance structure must be capable of stopping or redirecting investment efforts. Public administration students of the 21st century must be prepared to make understand and operate in terms of these distinctions and new priorities.

6.4. Transnational Problems and the Internationalization of Public Administration

Globalization priorities are driving many countries to work together in new ways. New partnerships are being formed around common economic and social issues as well as shared challenges. Current efforts to create transnational processes in the European Union and in North America that facilitate benefits management for cross-border workers are examples of these new modes of operation. However, efforts to collaborate within national border regions face unique challenges such as diverging national, as well as state, provincial, and local agendas, different legislation and regulation systems for providing services, accessing, and sharing both citizen and government information, cultural differences (e.g. language barriers, resistance to technological innovation), and technological problems related to the integration of the deployed systems (Navarrette *et.al.*, 2008).

Despite significant advances in knowledge about this phenomenon within the context of a single country, we still know little about the factors underlying inter-governmental collaboration across borders. The shortage of research studying information sharing in the transnational context has also been discussed in a recent report released by the Center for Technology in Government (CTG). This study reports that research on transnational efforts in e-government comprises only 4% of the total research in e-government (Helbig *et.al*,. 2007). Findings also suggest that existing studies have been mostly conducted by European Union States (Letho *et.al.*, 2004, Luna-Reyes et.al., 2007). Research is this domain overall is clearly scarce and an analysis of the interactions of political, economic and cultural contexts and the information needs of cross-border interoperable systems is fully missing. Creating an IT enabled public administration requires us to consider in new ways how networks which bridge the borders of countries can create collaborative governance and information sharing capability.

Preparing students to work in this context requires new focus on the international context. The individuals responsible for developing collaborative decision making processes to guide information sharing in border regions are found in the local and state agencies in those regions. Students, regardless of their intended level of government or regional location must with understand this context. Providing students with research and case studies of the international efforts to manage air quality in the U.S. Mexico and U.S. Canada border regions, for example, will provide insight into the challenges government agencies are facing as they seek to work together in new ways on transnational problems. Other efforts related to border security, mobile workforces, and public health provide similar opportunity. Reaching out beyond the traditional framework of the Public Administration curriculum to engage scholars from the fields of public health and education might provide case examples of how governments are collaborating across borders in new ways to connect systems and share information. Encouraging students to engage in studies of government efforts to work across borders to resolve transnational problems will provide new knowledge about this phenomenon. Comparative studies of cross-border information sharing are necessary as well to illuminate this new phenomenon. Drawing on the experiences of the United States, the European Union and other regional integration efforts will provide students with insights into how collaborative governance efforts have created in capability for interoperability and information sharing.

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