



Editorial

Government Information Networks - Mapping Electronic Governance cases through Public Administration concepts

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ABSTRACT

Facing economic pressure, social tensions, global competition and low public confidence, governments can no longer afford to address increasingly complex and interdependent public goals alone or step back and rely on the markets. Instead, they have to work through networks of state and non-state actors to organize existing resources, knowledge and capabilities in the pursuit of public goals. The new paradigm increasingly relies on Information and Communication Technology (ICT) to connect actors to the network and to build, manage and sustain relationships between them. We refer to such ICT-enabled networks as Government Information Networks. This article serves as an introduction to the current issue of *Government Information Quarterly* on Government Information Networks. The issue comprises twelve cases of such networks selected from the papers submitted to the 5th International Conference on Theory and Practice of Electronic Governance, ICE-GOV2010, held in Beijing, China, October 2010. The article also presents a conceptual framework for public administration networks, and applies the framework to describe, analyze and compare the cases, thus relating the volume to the Public Administration literature.

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1. Introduction

Given the magnitude, complexity and inter-dependency of today's social, economic and other public needs, governments generally lack the resources, capacity or even legitimacy to seek the required change and to fulfill such needs alone, nor can they afford stepping back and letting the private sector and self-regulating markets pursue the common good alone. Instead, governments are increasingly required to collaborate across organizational, sectoral and administrative boundaries (Agranoff & McGuire, 2004), and to engage various non-state actors—businesses, nonprofits, associations, universities and even citizens, in jointly producing public value through networks (Goldsmith & Eggers, 2004a). This shift in the process of governing from bureaucracies and markets to networks recognizes the “blurring of boundaries and responsibilities for tackling social and economic issues” and the capacity for action that “does not rest on the power of government to command or use its authority” but “sees government as able to use new tools and techniques to steer and guide” (Stoker, 1998 on p. 21, 24).

Following its widespread diffusion in the government practice (Toole, 1997), the network concept has received an increasing attention in the Public Administration literature (Isett, Mergel, LeRoux, Mischen, & Rethemeyer, 2011), with partly overlapping research

streams dedicated to policy networks, collaborative networks and, more recently, governance networks. A policy network is a collection of actors - government agencies, legislative offices, interest groups, etc. with a stake in a given sector and the capacity to help determine the success or failure of public policies in this sector (Peterson & Bomberg, 1999). The outcomes of a policy network are influenced by its structure and context (Marsh & Smith, 2000). In contrast, a collaborative network exists to deliver public services, produce public value or generally contribute to the implementation of public policies when no government organization or the private sector can do this effectively on its own. They bring together government agencies, non-profit or profit-making organizations, and other levels of government using partnerships, contracts, alliances, committees, coalitions, consortia, councils and other kinds of multi-organizational or inter-governmental arrangements (Agranoff & McGuire, 2004). Collaborative decisions in such arrangements are “the products of a particular type of mutual learning and adjustment” (Agranoff, 2006 on p. 59). Finally, governance networks integrate both policy-making and policy-implementation, for instance by contributing to the implementation of the policies on sustainable development (Dedeurwaerdere, 2005). They combine “the voluntary energy and legitimacy of the civil society sector with the financial muscle and interest of the business and the enforcement and the rule-making power and coordination and capacity-building skills of states and international organizations” (Reinicke, Deng, & Witte, 2000 on p. 24). However, the concept still suffers from ambiguity, and is interpreted as both a self-organizing

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system and a system that facilitates active steering by government (Schout & Jordan, 2005). Following (Isett, Mergel, LeRoux, Mischen, & Rethemeyer, 2011), all three network contexts are part of the conceptual framework for public administration networks depicted in Fig. 1.

ICT is ubiquitous in all three network contexts. It underpins the technical and organizational infrastructure that helps connect various actors to the network, build relationships between them, resolve differences between actor-specific and network-wide objectives, and manage and sustain the networks themselves. Such responsibilities typically rest with the government Chief Information Officer (CIO) whose role goes “beyond simply supplying the technical infrastructure for networked government. CIOs will need to effectively manage people and relationships” and thus require skills in negotiation, mediation, risk analysis, trust building, collaboration and project management (Goldsmith & Eggers, 2004b). We call all ICT-enabled policy networks, collaboration networks and governance networks, Government Information Networks. The introduction of ICT into government organizations, including the establishment of Government Information Networks, is part of a larger transformational effort called Electronic Government – when ICT is used to transform the internal organization and working of government, or Electronic Governance (EGOV) – when ICT is used to transform the relationships between government and citizens, businesses, other non-state actors and other arms of government.

EGOV is a young domain characterized by: deep engagement with government practice (Field, 2003); wide range of enquiries at the intersection of administrative and political systems and civil society (Grönlund & Horan, 2005); competing influences from public administration, information systems, political science and other disciplines

(Scholl, 2007); and ongoing efforts to establish foundations. In particular, it was suggested that the EGOV research should be tied more strongly to the mainstream public administration research (Yildiz, 2007). In this way, EGOV would be in a better position to facilitate the introduction of ICT into public administration research and practice, by focusing on the organizational, policy and human contexts for government technology applications. The aim of this article is to examine how the network concept is applied in the selected EGOV literature - the current issue of Government Information Quarterly, using a conceptual framework derived from the literature on networks in Public Administration, thus contributing to the understanding and advancement of ICT-enabled public administration networks.

The current issue comprises twelve cases of Government Information Networks selected from the papers submitted to the 5th International Conference on Theory and Practice of Electronic Governance, ICEGOV2010, held in Beijing, China, October 2010. The cases cover the areas of: cross-domain search and retrieval of scientific, technological and legal information (Yu, Taduri, Kesan, Lau, & Law, this issue); service development and interoperability governance (Klischewski & Askar, this issue); efficient ICT adoption in a judiciary system (Andrade & Joia, this issue); electronic procurement portal measurement and maturity (Concha & Porrúa, this issue); boundaries of information sharing and integration (Yang, Zheng, & Pardo, this issue); business process management and policy implementation (Gong & Janssen, this issue); evolution of local government internet portals (Almazan & Gil-Garcia, this issue); electronic public service delivery by rural telecenters (Naik, Joshi, & Basavaraj, this issue); internet-enabled political participation (Nam, this issue); electronic public services for migrant farmer workers (Wang, this issue);

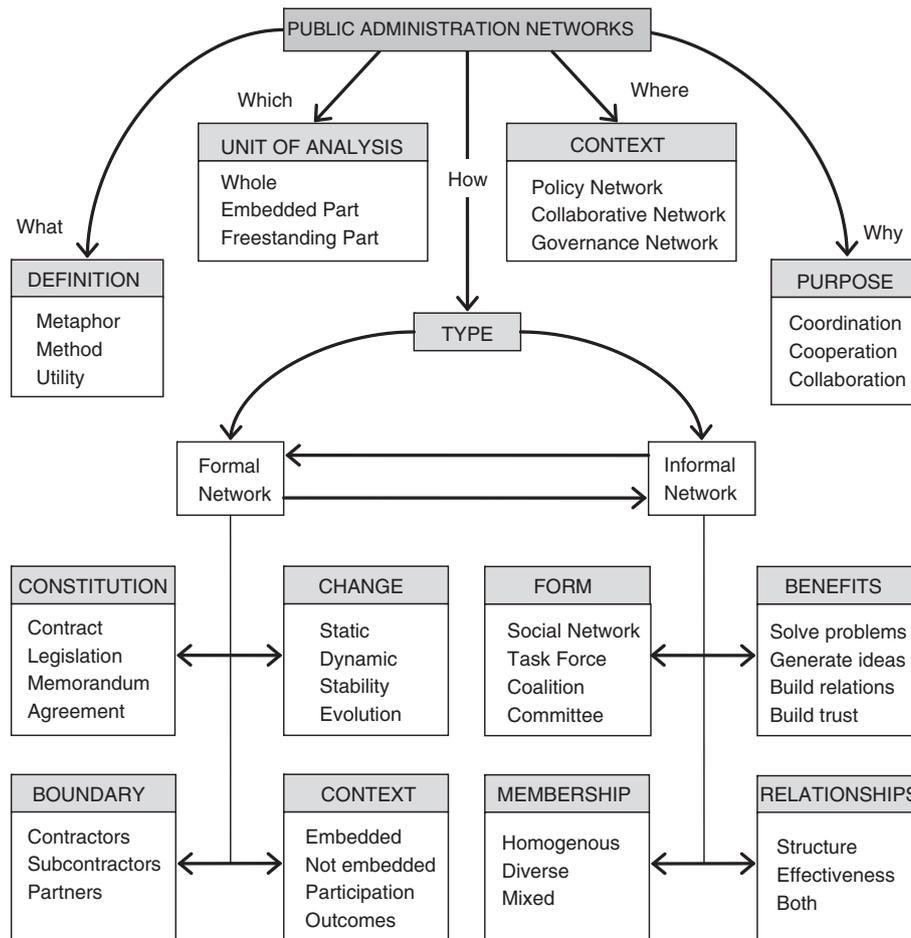


Fig. 1. Conceptual framework for public administration networks.

transnational public sector knowledge networks (Dawes, Gharawi, & Burke, *this issue*); and scenarios for ICT in future governance and policy making (Misuraca, Broster, & Centeno, *this issue*). Table 1 provides a synthesis of all cases.

In line with the aim of this article, the following process was applied to carry out this research: 1) describe a conceptual framework for public administration networks, 2) provide an overview of the twelve cases of ICT-enabled public administration networks described in this issue and apply the framework to describe and analyze each case, and 3) synthesize the findings and compare the cases for all dimensions of the framework. The article is structured accordingly, with Sections 2, 3 and 4 covering the respective steps of this process. Section 4 also contains a discussion and the final Section 5 presents some conclusions.

2. Conceptual framework - Public administration networks

Fig. 1 depicts a conceptual framework for public administration networks, largely obtained based on the review of the network-related Public Administration literature documented in Isett et al. (2011). In the figure, the central concept of Public Administration Networks is elaborated through five dimensions: 1) what - Definition, 2) which - Unit of Analysis, 3) where - Context, 4) why - Purpose and 5) how - Type. The dimensions are described in the sequel, illustrated with the cases of Government Information Networks included in this issue.

The Definition dimension covers three main applications of the network concept in Public Administration research (Isett et al., 2011; Knox, Savage, & Harvey, 2006): Metaphor - the network concept is not inherent in the study subject but viewing the subject as a network brings more clarity and understanding to it, for instance political participation as a network of citizens who interact with each other and with their elected representatives for the purpose of influencing government action (Nam, *this issue*); Method - applied as abstraction, the network concept makes available computational models, techniques and tools to apply to the study subject, for instance the use of network-based Service Oriented Architecture to aid the implementation of government-to-government interoperability facilitates the development of electronic public services as XML-based web services (Klischewski & Askar, *this issue*); and Utility - the network concept refers to the organization of autonomous but interacting agents that collectively pursue a common goal, for instance local government delivering public services to rural citizens through privately-owned telecenters (Naik et al., *this issue*).

The Unit of Analysis dimension determines whether the study subject is the whole network or its embedded or freestanding part (Provan, Fish, & Sydow, 2007): Whole network - for instance the local public information sharing network made possible by the inclusion of interaction, participation and collaboration features on the

local government portals (Almazan & Gil-Garcia, *this issue*); Embedded part of the network - for instance division of the government information sharing networks by mutually-dependant organizational, personal, sectoral, process and other boundaries (Yang et al., *this issue*); or Freestanding part of the network - for instance part of the science and technology information network focusing on biotechnology patents and related court litigations (Yu et al., *this issue*).

The Context dimension refers to the location of the network within a larger policy (Peterson & Bomberg, 1999), collaboration (Agranoff & McGuire, 2004) or governance (Schout & Jordan, 2005) context, as explained in Section 1. For example, the use of the internet to facilitate the interaction between citizens and their elected representatives for the purpose of political participation takes place in the context of policy networks (Nam, *this issue*); the application of mature Electronic Government procurement portals to enable transparent and efficient government-to-business relationships takes place in the context of collaborative networks (Concha & Porrúa, *this issue*); the use of flexible and agile business process management by organizational networks to facilitate efficient implementation of policy and legislative changes also takes place in the context of collaborative networks (Gong & Janssen, *this issue*); and the application of advanced ICT tools and modeling techniques and integrating them into policy-making mechanisms and governance processes takes place in the context of both policy and governance networks (Misuraca et al., *this issue*).

The Purpose dimension determines the intended purpose of the network, which typically includes coordinative functions, for instance the role of the National Council of Justice to coordinate the adoption of ICT by the Brazilian judiciary system (Andrade & Joia, *this issue*); collaborative functions, for instance collaboration between the Egyptian Ministry of State for Administrative Development and various providers of administrative and electronic services in developing interoperable government-to-government services (Klischewski & Askar, *this issue*); as well as information sharing (Yang et al., *this issue*), knowledge sharing (Dawes et al., *this issue*), local electronic governance (Almazan & Gil-Garcia, *this issue*), and access to public information and services to vulnerable groups (Wang, *this issue*). However, “The most distinctive collaborative activity of all of the networks proved to be their work in public sector knowledge management” (Agranoff, 2006 on p. 60) including the role of public sector knowledge networks “to address public needs that no single organization or jurisdiction can handle alone” (Dawes, Cresswell, & Pardo, 2009 on p. 392).

The Type dimension differentiates between formal and informal networks, where “Formal networks are consciously created with some sort of binding agreement for participation, whereas informal networks are more organically derived” (Isett et al., 2011 on p. 162). For example, the Brazilian judiciary system is a complex formal network of autonomous judicial units with their own networks of courts and supporting administrative units (Andrade & Joia, *this issue*); the

Table 1
Twelve cases of Government Information Networks.

No	Case	Focus				Relationships			
		Technological	Organizational	Social	Transnational	G2C	G2B	G2G	C2G
1	Cross-domain search and retrieval (Yu et al., <i>this issue</i>)	X					X	X	
2	Service development and interoperability governance (Klischewski & Askar, <i>this issue</i>)	X						X	
3	Efficient ICT adoption in judiciary system (Andrade & Joia, <i>this issue</i>)		X			X		X	
4	e-Procurement portal measurement and maturity (Concha & Porrúa, <i>this issue</i>)		X				X		
5	Boundaries of information sharing and integration (Yang et al., <i>this issue</i>)		X					X	
6	Business process management and policy implementation (Gong & Janssen, <i>this issue</i>)		X	X			X		
7	Evolution of local government internet portals (Almazan & Gil-Garcia, <i>this issue</i>)		X	X		X	X		X
8	Electronic public service delivery by rural telecenters (Naik et al., <i>this issue</i>)			X		X	X		X
9	Internet-enabled political participation (Nam, <i>this issue</i>)			X					X
10	Electronic public services for migrant farmer workers (Wang, <i>this issue</i>)			X		X			
11	Transnational public sector knowledge networks (S. Dawes et al., <i>this issue</i>)				X			X	
12	Scenarios for ICT in future governance and policy making (Misuraca et al., <i>this issue</i>)				X	X	X		X

rural information system through which citizens use telecenters to access business-provided services is an informal network (Naik et al., [this issue](#)); and transnational public sector knowledge networks are formal networks between government organizations that heavily rely on informal relationships and interactions between network participants (Dawes et al., [this issue](#)). Informal networks tend to formalize over time in a process that leads them toward obtaining more capacity and legitimacy. For instance, informal forms of political participation like “participating in community affairs”, “making a donation to a party” or “attending political meetings” and associated networks could give rise to more formal networks and related activities like “helping form a political group”, “belonging to a political club” or “working in campaigns” (Nam, [this issue](#)). Likewise, the inclusion of government-originated services in the offering of rural telecenters, in addition to business-originated services, could lead to the formalization of the rural information networks and, as a result, strengthening their capacity for pursuing rural growth (Naik et al., [this issue](#)).

Fig. 1 also elaborates on specific features of the formal and informal networks. In particular, formal networks are characterized by their: Constitution - contracts, enabling legislations, memoranda of understanding and other institutional agreements; Boundaries - inclusion of non-public contractors, networks of subcontractors or informal network partners; Change - if the networks are considered static or dynamic and, in the latter case, how their evolution and stability are addressed; and Context - if the networks stand on their own or are embedded in a larger policy context, in the latter case what is the influence of this context on network participation and network outcomes. Informal networks, on the other hand, are characterized by: Form - social networks or inter-organizational networks in the form of task forces, coalitions or committees; Membership in the network - whether homogeneous, diverse or mixed; Benefits offered to participants - solving problems, generating ideas, building relationships, building trust and other; and Relationships between participants and how they affect the structure and effectiveness of the network.

3. Cases of Government Information Networks

This section presents twelve cases of Government Information Networks described by the articles included in this issue, and applies the conceptual framework in [Section 2](#) to obtain a uniform description of each case, amendable to comparative analysis. [Table 1](#) provides an overview of all cases including their focus – technological, organizational, social or transnational; and network relationships considered – government to citizen (G2C), government to business (G2B), government to government (G2G) and citizen to government (C2G). The cases are presented in subsequent sections in the order determined by their focus, from technological, through organizational and social, to transnational.

3.1. Case 1 - Cross-domain search and retrieval

In “Mining information across multiple domains: A case study of application to patent laws and regulations in biotechnology”, Hang Yu, Siddharth Taduri, Jay Kesan, Gloria Lau and Kincho Law present a framework to process user queries and carry out information retrieval from the documents originating in different information domains. The framework focuses on biotechnology-related patent, legal and scientific databases. It responds to the challenges faced by those involved with the preparation of patent applications – inventors, agents, lawyers, etc. who must search disparate patent databases, academic journals and court documents, and collect and cross-reference the resulting documents for effective use. A system to help in this task is not available. The framework is applied in three steps. The first step determines, using an ontology, what keywords can represent a given user query in different information domains. The second step applies

the keywords to carry out the joint search in the corresponding databases. For instance, it identifies the core set of patents from the patent database and the publications cited by these patents from the scientific database. The third step modifies the result based on user feedback, for instance it calculates the number of core patents citing a publication divided by the total number of citations received by the publication in the scientific database. The authors finally describe how the framework was applied to carry out the joint search of the United States Patent and Trademark Office (USPTO) patent database and the National Institute of Health (NIH) scientific publication database.

While the article does not use the network concept explicitly, the network metaphor can be applied in this case to represent the public science and technology information network (Network) to include various sources of science and technology information like “administrative agencies that deal with various science and technology issues”, “the court system”, “relevant laws and regulations” and “scientific publications”, and to determine how such information can be used by companies, scientists, etc. across various sources and the corresponding information domains. The unit of analysis is part of the Network focusing on “searching biotechnology patents”. The Network is situated within two contexts: policy context involving “administrative agencies, such as the U.S. Patent and Trademark Office, and the federal courts”; and collaborative context involving government agencies, businesses and individuals involved in the preparation of patent applications, all using the provided multi-domain search service. The purpose of the Network is promoting innovation, protecting intellectual property and generally advancing knowledge, while the framework contributes to this purpose by offering a search service across different information domains in the Network. The Network is partly formal, comprising agencies which “promulgate regulations” and the courts which “interpret the relevant ... regulations”, and partly informal comprising businesses which “activities may be implicated by a particular technology sector”.

3.2. Case 2 - Service development and interoperability governance

In “Linking service development methods to interoperability governance: The case of Egypt”, Ralf Klischewski and Eman Askar explore the extent to which the current approaches to service development support interoperability governance, and what kind of changes in development methods and their applications would yield improvements in interoperability governance. They note that governance has been identified as the most critical issue in developing and managing interoperability but little attention has been paid to the role and contribution of development methodologies to interoperability governance. In particular, while the general guidelines for service development and Service-Oriented Architecture (SOA) governance exist, it is unknown to what extent governments are able to follow existing development approaches, and there is no research addressing the contribution of service development methods toward developing and managing government interoperability. The authors present their view on the criticality of this relationship, in particular in the case of government adoption of SOA as an approach to interoperability. The case of Egypt, where SOA was chosen as the main interoperability approach, has been investigated in terms of how government-to-government (G2G) services are developed, what challenges exist, and what methodological enhancements are required to address the challenges and improve the development. Drawing on the analysis of the case, the article presents four success factors for linking the G2G service development methodologies to the objectives of interoperability governance: interoperability problem perception, method scoping and deliverables, measurement of goal achievement, and methodological commitment.

The article describes a government service network (Network) comprising “networked stakeholders who participate in development, provision, and consumption of government related services”. The

stakeholders include: Ministry of State for Administrative Development (MSAD) “responsible for coordinating the multi-party agreements for service provision and monitoring the service implementation”, service requestors responsible for “providing service requirements for development” and service providers responsible for service implementation. MSAD has also defined a “general process to interrelate the contributions of the stakeholders involved” including “study of services and requested documents”, “G2G service specifications”, “service protocols” and other. As such, the Network is used as a utility aimed at following a “methodology-driven approach in providing e-government services to citizens”. The unit of analysis is part of the Network including the interactions between service requestors, service providers and MSAD, “how the stakeholders involved perceive and maintain the link between service development methods and interoperability governance” and “to what extent service development methods in use actually support the interoperability governance”. The Network is located within the collaborative context, including government service provisioning, with two main purposes: coordination for “developing services supporting G2G interoperation in Egypt” and collaboration to ensure “stakeholder commitment toward collaboration and aligning them with the overall interoperability governance”. The Network is formally maintained by MSAD through “multi-party agreements”, “defined roles and assigned responsibilities” and enforced “procedure to ensure collaboration during service development”.

3.3. Case 3 - Efficient ICT adoption in judiciary system

In “Organizational structure and ICT strategies in the Brazilian judiciary system”, Andre Andrade and Luiz Antonio Joia use an explanatory case study to examine the influence of organizational structures on the development and adoption of ICT within an organization. In particular, the case study investigates the effect of the National Council of Justice on the introduction of ICT to the Brazilian Judiciary System. Relying on the recent work on e-government maturity models, the case study applies a three-stage model to highlight the influence of the Council on the development processes and to examine the tensions introduced as different parts of the system work within the current distributed development model. The unique role of the Council for coordinating the development and implementation of ICT strategies, and for introducing a common set of standards across the whole Brazilian Judiciary System, is highlighted. The article also provides recommendations for researchers, practitioners and policy makers to more clearly examine the dynamics and peculiarities of strategy-driven ICT and e-government implementation. It also notes the need for more research to examine how similar endeavors have worked in other countries, in order to enhance external validity of this research, particularly as the legal systems are different throughout the world. The USA and the UK, for instance, adopt the common law paradigm, which is very different from the Roman-German legal system adopted by Brazil. This fact alone highlights how difficult it is to develop general prescriptive solutions to address e-government development needs.

This work exemplifies a formal collaborative network (Network) comprising “over 100 autonomous judiciary units” of the Brazilian Judiciary System, each with various courts “specialized according to matter, territory and instance” and administrative units responsible for providing internal services to courts. One of such judiciary units is the National Council of Justice (NCJ), charged with overseeing “the administrative and financial management of the Brazilian courts, and the fulfillment of office duties by judges”. The unit of analysis is the entire Network focusing on the introduction of ICT to the system and on the role of NCJ in this process. The purpose is to make the Brazilian Judiciary System similar to “virtual firms, created via digital links between several companies - in such a way that it is almost impossible to define their precise boundaries”, reversing the current practice of “decentralized planning and decision-making, as well as duplication

of efforts”. To this end, the article suggest that NCJ should play the role of integrator and “focus point with respect to ICT strategy development and implementation”, by “adopting effective measures for coordination and formulation of ICT strategies”, “conducting strategic planning within the Judiciary”, making sure that “different autonomous administrative units ... agree to adopt common standards” and assuring “the interoperability of the systems developed from then onwards”. The Network is formal and established in law; NCJ was established “by Constitutional Amendment No. 45, in 2004”.

3.4. Case 4 - E-procurement portal measurement and maturity

In “E-government procurement observatory, maturity model and early measurements”, Gaston Concha, Hernan Astudillo, Miguel Porrua and Carlos Pimenta focus on the measurement of e-government procurement (eGP) portal performance. They argue that the eGP portals play an essential role in the national e-government programs, including the creation of greater efficiency and transparency, but note that although maturity models which support such measurement efforts have been proposed for other domains, no such widely deployed model exists for eGP. In response, the article outlines a theoretical framework for future maturity-oriented studies of eGP portals and applies this framework as the foundation of the introduced e-Government Procurement Observatory Maturity Model (eGPO-MM); the model focuses on the legal and institutional arrangements, as well as technical aspects of the portals. The model comprises two leverage domains, seven key domain areas, and 25 critical variables, and applies a weighted scoring system that produces quantitative indicators about portal capabilities and allows direct comparisons between them. The model was tested through its application to the eGP portals in 16 countries in Latin America and the Caribbean, generating results that fit well with the perceptions of the agencies involved. In addition to providing a clear reference point to allow each agency to determine a roadmap to higher e-procurement maturity, the use of eGPO-MM, according to the authors, resulted in the identification of the joint action areas and fostered knowledge-sharing among governments, including identification and dissemination of e-procurement best practices.

This work exemplifies two applications of the network concept: the first is the network of buyers (government agencies) and suppliers (businesses) engaged in transparent and “efficient vendor relationships” through the eGP portals (e-Procurement Network), and the second is the network of national-level agencies “in the countries of the Americas, responsible for regulation, management and modernization of public procurement”, called the Interamerican Network on Government Procurement (Interamerican Network). The network concept can be applied as a metaphor in the first case and as a utility in the second case. Both cases occur in the collaborative context and both are formal. The unit of analysis in the e-Procurement Network is the networked operation of the eGP portal itself, including its interactions with buyers, suppliers, eGP agencies, “governing body responsible for establishing major policies and strategies”, “independent external certification authority for issuing digital certificates”, etc. The unit of analysis in the Interamerican Network comprises “national government procurement agencies from 16 Latin American and Caribbean countries” that took part in the eGPO pilot study. Further, the purpose of the e-Procurement Network is to “increase transparency”, “decrease corrupt practices”, “increase productivity of day-to-day procurement activities within agencies” and “attract new suppliers to do business with the government” (collaboration) through the application of the eGP portals; while the purpose of the Interamerican Network is “fostering knowledge-sharing among agencies”, “identifying and disseminating e-procurement best practices” and “determining what requires to be done to achieve a higher maturity level” (cooperation).

3.5. Case 5 - Boundaries of information sharing and integration

In “The boundaries of information sharing and integration: A case study of Taiwan e-government”, Tung-Mou Yang, Lei Zheng and Theresa Pardo seek to develop a new understanding of boundaries in cross-boundary information sharing and integration efforts in e-government. The article adopts an integrated framework of boundaries from the literature and applies that framework to examine the case of e-government in Taiwan. In particular, the case study focuses on the “e-Networking Project of Government Online Service” and the resulting “Government Service Platform” which aims at providing integrated services to the government and the public across several information systems covering the areas of household registration, land administration, financial taxation, commerce information, and motor vehicle and driver information. The question of interest is “what are the boundaries” in cross-boundary information sharing and integration. The authors note that previous work on boundaries in the context of public sector cross-boundary information sharing and integration has generally been focused on organizational boundaries; with some work also identifying personal, sectoral, and geographic boundaries. Building on this earlier work, the article refines and validates the current understanding of various vertical—across levels of government, and horizontal—across functions of government boundary dimensions, and applies the case study to introduce a new vertical boundary dimension—process dimension. Furthermore, the article shows, relying again on the Taiwan case study, how the use of centralized information systems can help crossing and alleviating boundaries.

This work exemplifies two applications of the network concept. The first is a network between individuals and organizations belonging to various sectors, functions and jurisdictions, and the presence of various boundaries between such entities that inhibit information sharing and integration (Cross-Boundary Network). The second is a network used in the case study “to facilitate central government agencies to share information across horizontal boundaries” (Government Service Platform). The Cross-Boundary Network applies the network concept metaphorically, while the Government Service Platform is a network in the utility sense. In both cases, units of analysis are parts of the networks delimited by the corresponding boundaries. As the boundaries are inter-dependant “government agency inevitably encounters different vertical and horizontal boundaries simultaneously, and the boundaries also interact with each other”, these parts are embedded in the corresponding networks. Both networks are situated in the collaborative context. In particular, the Government Service Platform aims at the provision of “integrated and efficient services to the public, private firms, public organizations, as well as government agencies”. The purpose of boundary-crossing is information sharing and integration, which in turn underpins any collaborative or coordinative functions. Finally, the Government Service Platform is a formal network, while the Cross-Boundary Network could be formal or informal, typically depending on whether the boundaries are organizational—“organizational boundaries occur among government agencies due to the differences in their defined missions, utilized resources, organized capacities, assigned responsibilities, and respective accountabilities” or personal—“Interpersonal relationships and interactions can influence attitudes and intentions to share information”.

3.6. Case 6 - Business process management and policy implementation

In “From policy implementation to business process management: Principles for creating flexibility and agility”, Yiwei Gong and Marijn Janssen present a set of four principles for increasing the levels of flexibility and agility in business process management systems, aimed at helping organizations implement the required legislative and policy changes; flexibility is the ability to react to changes, while agility is the speed in responding to variety and change. The principles are:

- 1) defining and using business services;
- 2) integrating and orchestrating business services through the use of events;
- 3) separating process, knowledge and resources;
- and 4) implementing policy in an integrated manner.

Business process management, the authors note, rarely focus on the link to the policy making process. However, policy executors are often required to implement policy changes which are “expensive, can have long lead times and are prone to failure” which in turn constrains policy makers in pursuing their main concern - fulfillment of “societal needs”. With these principles, policy makers should take into account the current levels of flexibility and agility of the implementing organizations when developing or revising legislations and policies, while policy executors should increase the levels of flexibility and agility in their organizations to be able to effectively implement legislative and policy changes. A case study referring to specific changes in the Dutch immigration regulations is used to illustrate the four principles.

This work exemplifies the network concept through a formal organizational network involved with developing and implementing legislative and policy changes, and the execution of the corresponding horizontal - “necessary for service provisioning to citizens and businesses” and vertical - “concerned with strategy formulation and policy deployment” processes (Network). The network concept can be applied in this work as both a metaphor - to better understand inter-organizational nature of the horizontal and vertical processes and “inter-dependencies with other systems”, and utility - to address “societal needs” by developing and implementing the required changes. The unit of analysis is part of the Network involved with policy implementation - “new or altered legislation might influence a number of business processes and might also go beyond the border of a single organization”; “policy and law-making is considered to be outside the scope”. The context for the Network is the implementation of the policy and legislative changes - “the executors take the legislation as input and implement the policy in their operational processes and infrastructure”. The purpose of the Network is enabling collaborative policy implementation, responding to the problem that “Policies are implemented in isolation by each public agency, irrespective of the implementation already realized by other agencies [and] this results in a huge interoperability problem and duplication of activities among organizations”, helping realize the fourth flexibility and agility principle. Finally, the Network is formal, established according to the current legislation and policy.

3.7. Case 7 - Evolution of local government internet portals

In “Are government internet portals evolving toward more interaction, participation, and collaboration? Revisiting the rhetoric of e-government among municipalities”, Rodrigo Sandoval Almazan and Jose Ramon Gil-Garcia study the inclusion of the interaction, participation and collaboration mechanisms as part of the local government portals. By applying such mechanisms, they argue, local government portals could become “powerful tools to exchange information and knowledge between different social actors and government entities and to enable participation in collective decision-making efforts about important public affairs”, contributing to the emergence of “new models of local governance”.

The article applies a five-stage development model to increase collaborative and participatory features of government websites: 1) information display, 2) provision of services, 3) tools for interaction, 4) channels for participation and 5) opportunities for collaboration; and reviews the availability of various concepts, tools and applications to support such development. The model has been applied to carry out a survey of 108 local government portals in Mexico, including 71 urban and 37 rural government portals. The results confirmed that “local governments are doing relatively well” in information display and provision of government services, but the use of interaction tools and applications, and participation channels is limited, while the

“opportunities for collaboration within the local government websites” are non-existent. Thus, according to the authors, “Local government portals in Mexico are not embracing more interaction, participation, and collaboration and, consequently, no new models of local governance have emerged”.

This work exemplifies the network concept through the public information sharing network of “government and non-government actors exchanging information and services, but also participating and collaborating with each other through emergent technology tools and applications integrated with new government websites” (Network). The network concept can be applied in two ways: as a metaphor to explain the role of government websites - “government websites could become central components of public information sharing networks” and as a utility for achieving local e-governance - “these networks could be the basis for new local e-governance models, since there is the potential for true collaboration and joint decision-making”. The unit of analysis is part of the Network centered on the “interaction, participation, collaboration, and information sharing among government agencies” and “between government agencies and other social actors such as citizens, businesses, and non-profit organizations” made possible by local government portals. This unit is located in the governance context and its main purpose is local electronic governance - “the potential for local electronic governance through networks of government and non-government actors via internet portals is clearly present”. Given the level at which the paper examines the role of portals, the Network may be formal or informal. The distinction can be largely drawn along the lines of government-to-government or government-to-citizen interactions - “The promotion of collaboration can be seen in at least two ways: either citizens collaborate with government or government agencies collaborate with one another”.

3.8. Case 8 - Electronic public service delivery by rural telecenters

In “Fostering inclusive growth through e-governance embedded rural telecenters (EGERT) in India”, Gopal Naik, Siddharth Joshi and K.P. Basavaraj address the growing recognition of the potential of rural markets and increasing use of telecenters for providing government-to-citizen (G2C) services to rural citizens in India. The authors argue that designing rural telecenters with embedded G2C services would “significantly improve effectiveness of their delivery and strengthen government information network, to foster inclusive growth”. However, they note, regardless of the potential of telecenters to “improve governance at the lowest levels of administration by substantially improving the process of collection and management of data related to various government programs”, e-governance efforts often focus on commercial services “making [telecenters] unviable at village level”. Drawing on an action research study, the article argues that telecenters are particularly well placed to stimulate demand for services by the rural poor who are constrained by distance and high opportunity cost involved in traveling to urban centers to avail them. It also argues for a “design of service basket” dominated by G2C services and illustrates through their study that “even telecenters catering to populations as small as 10,000 can become viable”. The article also presents a conceptual framework for financial sustainability of telecenters, through which it shows that as telecenters cater to small populations, a provision of a cluster of complete and integrated services, including G2C services, becomes critical for their sustainability.

This work exemplifies the network concept through a telecenter-originated “consortium of citizens, government, academic institutions and IT companies” (Network). The Network is defined as a utility which offers “bottom-up model for delivery of content, services, information and knowledge”. The unit of analysis is an embedded part of the Network focusing on the provision of integrated government services to citizens; “unless a large cluster of complete set of services is provided in an integrated manner, it will be difficult to sustain

telecenters in remote areas” while “e-Governance Embedded Rural Telecenters ... can ... facilitate improved flow of information between government and citizens leading to substantial dual gains”. The Network is located in the collaborative context, with telecenters enabling “like-minded public and private enterprises – through a collaboration framework – to integrate their goals of profit as well as social objectives”. The main purpose of the Network is supporting the delivery of services to foster inclusive rural growth, as telecenters are “particularly well placed to stimulate demand for services in rural areas” and designing them with “embedded G2C services would significantly improve effectiveness of their delivery and strengthen government information network, to foster inclusive growth”. While the Network can start as an informal network to support the provision of commercial services to rural citizens, the inclusion of public services in the service offerings and government support for such telecenters - “national and sub-national governments have supported business to establish telecenters in rural areas”, can transform the Network into a formal one.

3.9. Case 9 - Internet-enabled political participation

In “Dual effects of the internet on political activism: Reinforcing and mobilizing”, Taewoo Nam examines the question if the internet is a vital tool for promoting participatory democracy. Using the data from the Citizen Involvement Democracy survey, the article examines the potential of the internet as a public space for political participation by assessing the arguments that the internet reinforces the existing patterns of offline political participation and that it mobilizes new participation by those who have abstained from participation offline. After investigating the categorical and demographic disparities between online and offline political participants, and testing the two-sided effects of the internet on political participation, the article presents three main findings. First, those who participate in online political activity do not differ categorically from those who conduct their political activity offline. Second, cross-group differences in how actively individuals participate in political activity make little distinction between offline and online modes. Third, the internet plays a dual role: mobilizing political participation by people who are not normally politically involved, and reinforcing existing offline participation. The article concludes that given the validation of both reinforcing and mobilizing arguments, utilizing the full “democratic potential of the internet may still be possible in some aspects, and to some extent”. With the reinforcement effect, the article notes, offline activists become active online, and thus their participatory channels become more diverse as they move between offline and online tools.

This work does not apply the network concept explicitly. However, the network metaphor can be used to represent how citizens interact with each other and their elected representatives through various traditional and online participation channels in order to “influence government action” (Network). Two concepts supporting this metaphor are: “interaction”—“The internet has the potential to further extend the public sphere from face-to-face interaction to online interaction”, and “participatory channels”—various forms of online and offline political participation. The unit of analysis, following the study of online and offline participation, is an embedded part of the Network representing different citizen groups depending on: “demographic variables, internet use, offline political activity, online political activity, civicness, political interest and political efficacy of the internet”. The Network occurs in the policy context and its purpose is “influencing government action - either directly by affecting the making or implementation of public policy or indirectly by influencing the selection of people who make those policies”. The Network can be informal (e.g. social networks) or formal (e.g. party membership) depending on the participation channel; the article examines the informal Network. However, the informal Network and related activities like “participating in community affairs”, “making a donation to a party”, “attending

political meetings”, etc. could give rise over time to a more formal Network and related activities like “helping form a political group”, “belonging to a political club”, “working in campaigns”, etc.

3.10. Case 10 - Electronic public services for migrant farmer workers

In “From potential users to actual users: Use of e-government service by Chinese migrant farmer workers”, Fang Wang outlines the challenges facing the rapidly increasing numbers of migrant farmer workers (MFW) in China and considers their status as a vulnerable group in the information society. According to the author, with the number of MFW surpassing that of traditional industrial workers, China is facing a series of social problems. In response, the government invested in infrastructure and institutions resulting in, among others, improvements in online services for MFW. However, as the “rate of MFW access to the internet is low” a question can be raised if the policy to invest in such online services without related investments is sound. To provide a new understanding of this policy, the article investigates the ability of MFW to use e-government services, their information seeking behaviors, and the factors influencing e-government adoption as part of this behavior. The investigation identified inconsistencies between the workers' information needs and information seeking behaviors, with income, information literacy, social network and IT environment as the main factors influencing their access to the internet. The article provides a six-stage model of the transition of MFW from non-users of e-government services to actual users, and a set of policy recommendations aimed at increasing the prospects for this transition to take place. The recommendations address improvements in the workers' information capacity, construction of special e-government programs for MFW, and enhancement of the public library systems and government service offerings to this group.

This work does not apply the network concept explicitly. Instead, the network metaphor could be used to describe information seeking networks (Network) that connect migrant farmer workers with various information sources at different levels of trustworthiness, which either reflect their information-seeking behaviors, fulfill their information needs, or both. The sources include “TV, internet, newspapers, cell phones, friends and relatives, etc.” and “the most trusted information sources by migrant farmer workers are TV program and government notices”. The unit of analysis is an embedded part of the Network which focuses on the delivery of government information and services through the internet; other information sources like “social networks” or “public library systems” may enable the transfer of MFW “from potential users of e-government services to actual users”. From the government's point of view, the Network is the outcome of a policy network aimed at addressing a specific social concern through targeted policy initiatives (the paper provides some recommendations to this effect). However, as the Network is also used by the government to create new or improve existing information sources, and deliver information and services to migrant farmer workers through them, it is also part of the collaborative context. The overall purpose of the Network is reducing “digital divide between rural and urban areas and different social groups” and specifically addressing the “problems of migrant farmer workers”. The Network is informal but may be supported by formal networks, for instance the network of public libraries “providing information services for migrant farmer workers”.

3.11. Case 11 - Transnational public sector knowledge networks

In “Transnational public sector knowledge networks: Knowledge and information sharing in a multi-dimensional context”, Sharon Dawes, Mohammed Garawi and Brian Burke explore the nature of Transnational Public Sector Knowledge Networks (TPSKNs) and identify critical contextual factors that shape their performance. The

authors argue that the increasingly complex global networks of political, societal, and economic dependencies “demand new kinds of knowledge sharing networks and information systems that combine both social and technical dimensions”. However, little empirical research is being carried out to understand and address the complexities of the knowledge and information sharing within such networks. Relying on two cases of TPSKNs aimed at air quality monitoring and improvement, one between United States and Mexico, and another between United States and China, and on the review of the relevant literature on knowledge transfer, cross-boundary information sharing and public sector knowledge networks, the article identifies the main characteristics and processes underpinning TPSKNs, and discusses contextual factors that influence the participation of individual organizations in such networks. Organized into three groups - knowledge and information context, organizational context and national context, the factors “create distance between the participating organizations that affect their ability to understand and engage with each other”. This leads the authors to propose the concept of a contextual distance, identify various kinds of distances in TPSKNs, and organize them into nine groups of cultural, political, intention, organizational, relational, knowledge, resource, physical and technical distances. The resulting conceptual model is intended to guide future empirical studies on TPSKNs.

This work exemplifies the network concept through transnational public sector knowledge networks - “two governmental sub-units located in different countries involved in the exchange of knowledge, information or both in order to address a mutual concern” (TPSKNs). Accordingly, TPSKN is defined as a utility. For example, the U.S.–Mexican case “comprises members representing all levels of U.S. and Mexican governments as well as academic researchers, industry, and environmental advocacy groups” all working toward the improvement of air quality in the U.S.–Mexico border region. The unit of analysis is the whole network, although the analysis focuses on the contextual factors that affect the participation of individual organizations in TPSKNs, as well as distances between participating organizations “that affect their ability to understand and engage with each other”. As TPSKNs “are emerging as a form of collaboration that operates across national and cultural boundaries on the basis of expertise and information rather than through the traditional channels of diplomacy among sovereign powers”, they are located in the collaborative context. However, policy and governance contexts are equally possible for such networks. The overall purpose of TPSKNs is “Sharing of knowledge, information, and practices across cultural and national boundaries” as a means of addressing “critical global problems”. Although TPSKNs are formally established, “the networks tend to be less formal and more flexible than is possible when working in official channels” and they “rely heavily on informal interaction, persuasion, and information to deal with critical areas such as security, the global economy, and environmental protection”.

3.12. Case 12 - Scenarios for ICT in future governance and policy making

In “Digital Europe 2030: Designing scenarios for ICT in future governance and policy making”, Gianluca Misuraca, David Broster and Clara Centeno outline a set of visionary scenarios for the development of the European Information Society toward 2030, and apply these scenarios to draw a roadmap for future policy making and research in the area of ICT for governance and policy modeling. The scenarios were designed through a foresight exercise conducted by the Institute for Prospective Technological Studies (IPTS) as part of the CROSSROAD Project, a support action of the European Commission's 7th Framework Programme. The exercise identified two main variables for scenario-building - one to reflect societal preference for high or low openness and transparency, and another to represent preferred governance response characterized by high or low integration in policy intelligence; and four corresponding scenarios depending on

the values of these variables: open governance—high openness and high integration, leviathan governance—low openness and high integration, privatized governance—low openness and low integration, and self-service governance—high openness and low integration. Subsequently, the scenarios center on the application of ICT and policy modeling techniques, and integrating them into governance and policy making processes. The findings focus on two areas: 1) expected change in ICT-enabled governance and policy-making in the context of different scenarios and 2) for each scenario, the risks and opportunities offered by ICT tools for governance and policy modeling, as regards to their contribution to the overall EU policy goals.

This work exemplifies the network concept metaphorically to represent the “increasingly distributed and networked character of the economy and of governance processes”. It also applies the concept as a utility, with networks of non-state actors delivering “traditional state functions” and co-creating “products and services delivered globally via peer-to-peer social networks” (Network 1); this kind of network is particularly related to the open and self-service governance scenarios. Another use of the network concept as a utility is collaboration between the state and non-state actors in co-designing of policies, “simulating and visualizing the effects of legal and policy decisions” and engaging in “real-time monitoring and prior assessment of possible expected impacts at local, regional, national and pan-European scale” (Network 2); this kind of network is particularly related to the open and leviathan governance scenarios. The unit of analysis is the whole Network, with governance and policy dimensions highlighted for Network 1 and Network 2 respectively. Accordingly, Network 1 is located in the collaboration context, while Network 2 is located in the policy context. Network 1 and Network 2 can also coincide, only with different purposes: co-production of public services and value for Network 1, and co-production of public policy and governance for Network 2. If they coincide, they would also belong to the governance context. The networks may be formal or informal, where the scenarios characterized by high or low openness and transparency would tend to rely on the informal and formal networks respectively.

4. Synthesis and discussion - Framework-based comparison of cases

Table 2 summarizes the results of analysis of the twelve cases of Government Information Networks presented in Section 3, by applying the conceptual framework for public administration networks from Section 2. This section looks more closely at the content of this table and makes some general observations.

The first observation is that for all twelve articles included in this issue, it was possible to discover the application (explicit or implicit) of the public administration network concept. In fact, for a number of articles, more than one applications of the concept was discovered. This may lead to a hypothesis, subject to further study of the existing body of literature, that the network concept may be ubiquitous in Electronic Governance research.

The second observation is that for all twelve cases, it was possible to determine the values of all dimensions of such networks according to the conceptual framework. In fact, in several cases, more than one value was assigned to a single dimension, either because the cases included more than one application of the network concept with different characteristics, or the values offered in a given dimension were not mutually exclusive (for instance policy and governance contexts) or too close to decide (for instance freestanding and embedded networks parts). This observation may serve as an initial validation of the proposed conceptual framework for describing Government Information Networks, or at least show the sufficiency of the conceptual framework for describing the cases.

Table 2 Twelve cases of Government Information Networks analyzed.

Case	Definition		Unit of analysis				Context			Purpose					Type	
	Metaphor	Method	Utility	Whole	Embedded part	Freestanding part	Policy network	Collaborative network	Governance network	Coordination	Cooperation	Collaboration	Other	Formal	Informal	
1	X					X	X						X	X	X	
2			X			X	X				X			X		
3			X	X		X	X		X					X		
4	X		X			X	X				X			X		
5	X		X		X	X	X				X			X		
6	X		X			X	X				X			X		
7	X		X			X	X				X			X		
8			X			X	X				X			X		
9	X		X			X	X				X			X		
10	X		X			X	X				X			X		
11			X	X		X	X				X			X		
12	X		X	X		X	X				X			X		

The third observation is that, by definition, technology is at the center of all twelve articles and the cases of Government Information Networks described by them. However, this dimension is absent from the conceptual framework for public administration networks, and therefore the cases were not analyzed in view of how they rely on technology. Possible scenarios for technology usage by such networks include: attracting and connecting new members to the network, carrying out network management functions, scaling up the networks to ensure their sustainability, reconciling individual and collective goals, producing technology for other networks to use, etc. Such scenarios could inform, subject to further analysis and research, the process of refining the conceptual framework to better describe ICT-enabled public administration networks.

5. Conclusions

This article serves as the introduction to the special issue of Government Information Quarterly on Government Information Networks. It provides an overview of the articles, offers a conceptual framework for public administration networks based on the current state of network-related research in the Public Administration literature (Isett et al., 2011), and applies this framework to describe and analyze how the articles apply the network concept. The conceptual framework covers five dimensions of the concept: what – definition, which – unit of analysis, where – context, why – purpose and how – type. Given a variety of applications of the network concept confirmed by the analysis, the issue contributes to the body of knowledge in Government Information Networks in both Electronic Governance and Public Administration research.

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