

Beyond the Debate over Centralized vs. Decentralized IT Governance: Lessons Learned from Two Leading Municipalities

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Abstract: IT governance as the structure and process of managing IT is a crucial organizational arrangement for fully exploiting the potential benefits of IT. The literature on IT governance suggests two distinctive approaches—centralized versus decentralized IT governance, and a hybrid model located between the two extremes. Two case studies from Washington D.C. and Gangnam-gu illustrate that the choice of IT governance model is associated with organizational and environmental contexts, and successful IT management depends on how well a government creates an IT governance structure and process compatible with given conditions.

Keywords: IT governance, centralization, decentralization

INTRODUCTION

The recent security breach that occurred in the Veterans Affairs Department in the United States has provoked the debate over whether the department needs a more centralized IT governance by upgrading the CIO [Chief Information Officer] position to the undersecretary level and allow more control authority to the CIO. In an interview conducted three months before the laptop computer theft involving the records of 26.5 million veterans happened, Robert McFarland, then CIO of the department, was requesting more direct control authority by openly favoring a more centralized IT governance in the department (Perera 2006). After the incident, acting CIO Robert Howard further strengthened the efforts to centralize the IT governance, but other Veterans Affairs officials have resisted by arguing that “the department’s (already) ‘federated’ IT management model gives the CIO the necessary authority and enforcement powers to improve information security” (Pulliam 2006).

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The VA department case exemplifies the perennial debate over centralized versus decentralized IT governance. The advancement of information technologies has promised to governments at all levels and in all countries a variety of benefits. In order to reap the expected benefits of information technologies, governments need to acquire and organize diverse capabilities and cope with the challenges of adopting, operating, and maintaining information systems and applications. The limited resources available for managing information technologies lead governments to formulate various types of arrangements to govern crucial financial, technical, and human resources for IT. Governments need to design their decision-making structure and management process to coordinate different needs and demands from multiple units within the organization to efficiently organize IT resources and maximize the benefits of IT investment. Managing information technologies is not confined to selecting, developing, operating, and maintaining hardware and software, but it encompasses a broad array of tasks, such as designing and operating internal organizational and institutional processes to develop and maintain information systems, and managing external relationships (Fountain 2001; Kraemer et al. 1989).

The structure and process of governing the activities related to IT is called IT governance, which is typically defined as “the distribution of IT decision-making rights and responsibilities among enterprise stakeholders, and the procedures and mechanisms for making and monitoring strategic decisions regarding IT” (Peterson 2004, 8). IT governance sets the structure and process for an organization to manage key aspects of information technology, such as IT infrastructure, IT use, and project management (Sambamurthy and Zmud 1999). To design an effective IT governance model, organizations should be able to address the questions about the types of decisions to be made for IT management, the entities to get involved in the decision-making process, and the methods to implement the decisions (Weill and Ross 2004). In other words, IT governance defines how an organization maximizes its IT potentials by effectively coordinating technology and administrative resources (Boynton, Zmud, and Jacobs 1994).

Few previous studies on IT in public organizations, however, have discussed the structural and procedural arrangements for IT governance from a holistic perspective. Considering the scale of investment for IT and the significant impacts of IT on organizations, public organizations need to assess their IT governance arrangements and improve the areas that hamper the further progress of their IT capabilities (Lee and Perry 2002). The large scale of IT investment currently being made in the public sector and the complexity of a public organization’s tasks and surrounding environment make building a holistic model of governing IT a salient issue for any public organization pursuing an effective and high performing public administration.

Two cases are introduced in this study to illustrate how two municipal governments located in heterogeneous institutional, political, social, and economic contexts designed their IT governance to successfully respond to the challenges of managing information technologies by adopting different IT governance models. Comparing the unique political, social, and economic contexts of each municipality will explain how and why these municipalities chose different strategies for the same goal, i.e. effective use of information technologies, and provide lessons for other municipal governments striving for better performing government.

INFORMATION TECHNOLOGY GOVERNANCE: TYPOLOGY AND CONTINGENCIES

Centralized versus Decentralized IT Governance Model

The previous studies on IT governance confirm that there is no single best model of IT governance. Rather, the best IT governance structure and process should be contingent upon each organization's unique context (Brown 1997; King 1983). Most organizations choose an IT governance model between two distinctive options, centralized versus decentralized IT governance models. Three aspects shape the debate over centralization versus decentralization: the locus of decision-making activity, the physical location of IT facilities, and the position of IT responsibility within the structure of the organization (King 1983, 321). All the three issues are ultimately related to where an organization should concentrate the control of decision-making with regards to various activities of IT management. According to Weil and Ross (2004), key IT governance decisions for locating control over IT include:

- *IT principles* decisions for how IT is used in the business – Clarifying the business role of IT
- *IT architecture* decisions for organizing logic for data, applications, and infrastructure – Defining integration and standardization requirements
- *IT infrastructure* decisions for centrally coordinated, shared IT services – Determining shared and enabling services
- *Business application* needs for specifying the business need for purchased or internally developed IT applications – Specifying the business need for purchased or internally developed IT applications
- *IT investment and prioritization decisions* for decisions about how much and where to invest in IT, including project approvals and justification techniques – Choosing which initiatives to fund and how much to spend

(Weil and Ross 2004, 10 and 27).

In the discussion of how to integrate IT efforts with the organizational goals and activities, three IT governance arrangements have been the primary models in the literature of information systems research (Sambamurthy and Zmud 1999). First, the centralized IT governance model refers to the arrangement where the decision-making for all the three key IT activities, i.e. IT infrastructure, IT use, and project management, is consolidated into a single central authority (Sambamurthy and Zmud 1999; Peterson 2004). In a centralized IT governance arrangement, all the important decisions for IT investment are made by a single IT person (e.g. CIO), a single unit (e.g. an IT department), or a small group of top executives (e.g. a committee). The benefits of centralized IT governance include efficiencies of operation and synergy effects due to integration, specialization, economies of scale, consistency, and standardized control (Brown 1997; Peterson 2004). Centralized IT governance enables organizations to effectively oversee the IT decisions to achieve the goals of efficiency and accountability. A high degree of standardization is often favored in the centralized IT governance style to minimize the process management cost and promote a rapid organizational learning (Weill and Ross 2004). However, the centralized approach hampers the information flow and communication between the centralized IT unit and the functional business units, and the knowledge learned from previous IT transformation is not shared throughout the entire organization.

In contrast, decentralized IT governance is intended to enable functional units to own greater control over IT decisions to enhance responsiveness and flexibility (Peterson 2005). Especially an organization pursuing speedy innovation may find decentralized IT governance appropriate for reducing constraints such as organization-wide IT standardization, which hampers flexibility and innovation. This model is focused on encouraging local units to fully utilize their knowledge in subject areas and develop creativity to identify the areas of IT innovation while holding a high degree of autonomy. Strong divisional control and flexibility allow business units to respond to the internal and external demands for IT innovation in a prompt manner (Brown 1997). Rapid innovation and development at the functional unit level, however, may become unsustainable in the organization as a whole by incurring duplicate investment and incompatibility between different systems.

In order to ease the tension between centralized and decentralized IT governance models, organizations often adopt or evolve into a hybrid IT governance model. The key challenge of a hybrid model is balancing the contrasting advantages and disadvantages of two distinctive models (Peterson 2005; Sambamurthy and Zmud 1999; Weill and Ross 2004). Depending on the scope of IT activities governed by functional business units, a hybrid IT governance model can be close to either a centralized or decentralized approach.

“Best of the Both Worlds”

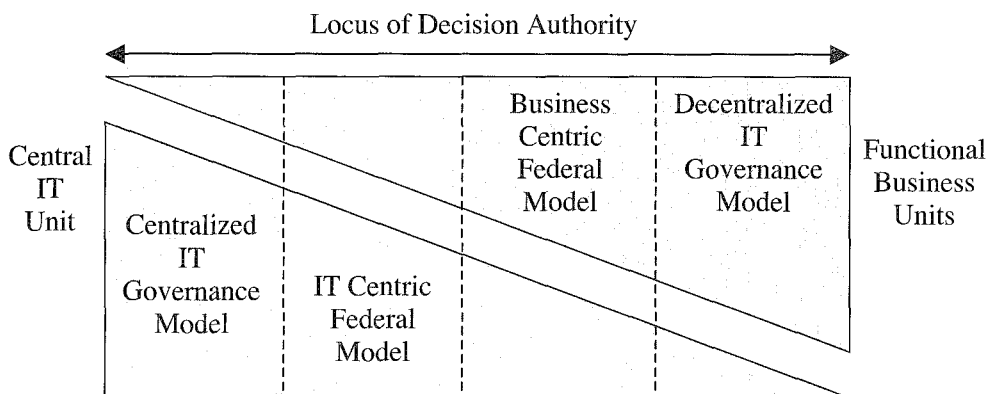
Many organizations and researchers have created multiple archetypes of IT governance to balance the contrasting advantages and disadvantages of centralized and decentralized governance models. Sambamurthy and Zmud (1999)’s frequently cited study suggests the federal governance model in which decision-making authorities for IT activities are distributed into a central IT unit as well as functional business units to achieve the best of centralized and decentralized models (Peterson 2004). Studies further find that even in the federal governance model some activities are typically centralized or decentralized: IT infrastructure related decisions tend to be centralized, while decisions for IT application are more likely to be decentralized (Brown and Magill 1998).¹

Within the federal IT governance model, variations can be found depending on the degree to which authorities are allocated primarily or evenly to the central IT unit or to the functional business units. The IT-centric federal model concentrates the authority of making decisions for IT networks and infrastructure on the organization-wide IT department, and grants decision-making authority for business application development to the IT units within functional business departments (Peterson 2005). In comparison, in the business-centric federal model, the leaders of the functional business units play the key role in making decisions for business application development, but the decisions related to the IT infrastructure belong to the central IT authority (Peterson 2005).

Factors Influencing the Choice of IT Governance Model

The popular managerial proverb of “one size does not fit all” is applicable to searching for an effective IT governance model. Figure 1 describes the variation in IT governance models by the locus of decision-making authority. The task of meeting the conflicting demands for flexibility and accountability versus efficiency and standardization requires organizations to scan the multiple contingency factors.

1. One of the most specific categorization is Weill and Ross (2004)’s classification. Depending on where the decision making authorities are concentrated, six archetypes are identified: Business archetype – top executives, IT monarchy – IT specialists, Feudal – Each business units, Federal – Combination of the executive leadership and the business units, IT duopoly – IT group and one other group, and Anarchy – isolated individual or small group decision making. This model delineates the variations within centralized, decentralized, and hybrid (federal) governance models.

Figure 1. Variation in IT Governance Models by the Locus of Decision-Making Authority

Conceptual and empirical studies on factors influencing an organization's model of IT governance have identified organizational structure, organizational strategy, environment, and absorptive capability of organizational members as the key determinants. First, the most common factor that shows a close association with the model of IT governance is the *general governance structure* of the organization. Studies have found that organizations nested in a centralized governance structure tend to adopt a centralized IT governance model (Brown 1997; King 1983; Sambamurthy and Zmud 1999). Second, the dominant strategy of the organization influences the choice of IT governance model. When an organization aligns its *strategies for innovation* (differentiation strategy), its IT governance is more likely to be decentralized to promote the innovative creativity in the subunits of the organization. In contrast, an organization in which strategies are focused on efficiency of operation would be more likely to adopt a centralized IT governance model to pursue integrated information systems for economies of scale (Brown 1997; King 1983; Sambamurthy and Zmud 1999). Third, the *stability of environment* is an antecedent influencing the IT governance model. When the conditions of the surrounding environment are fluctuating and the organization is experiencing severe competition with the entities comprising the external environment for acquiring scarce resources, the organization would be more likely to embrace a decentralized IT governance model because the organization needs prompt and intensive information processing (Brown 1997; Daft 1992). Fourth, the *absorptive capacity of general business managers* influences the arrangement of IT governance. The quality and scope of IT knowledge of non-IT managers indicates the ability to employ relevant IT resources and process critical information (Daft 1992). When business managers lack this ability, decentralized governing of IT would be more likely to result in improper decisions for IT (Sambamurthy and Zmud 1999). Thus, one may

expect there to be a negative association between the absorptive capacity and the degree of decentralization of IT governance.

Data and Methods

Data for illustrating the association between the organizational and environmental factors and the choice of IT governance model in the public sector context were collected from Washington D.C., U.S.A. and Gangnam-gu, Seoul, Korea. This study adopted a cross case study approach to compare the differences and similarities in IT governance between the two municipalities. Using a case study method is particularly useful for investigating why two municipalities chose different IT governance models and how the choice of IT governance influenced the operation of IT (Yin 1989). There are several similarities between these two municipalities. The population of Gangnam-gu was 540,909 as of 2005, while Washington D.C.'s population amounted to 582,049 in 2005. The municipalities also share common characteristics in terms of geographical location. Both municipalities are either the capital city (Washington D.C.) or a part of the capital city (Gangnam-gu).

Besides the general similarities, these two municipalities share some commonalities in terms of the current level of IT development and the history of innovation. First, both municipalities are the leaders in IT development in the United States and Korea. Washington D.C.'s IT is currently considered as having attained the top level among the state and city governments in the United States. One indicator is that D.C. has won several national awards for excellence in IT management, such as the Center for Digital Government's Best of the Web awards in 2003 and 2005 (Lake 2006). Gangnam-gu has also been one of the top municipalities leading the advancement of IT. Gangnam-gu has won many awards for the IT innovation and e-government transformation. It is a norm for many local governments in Korea to benchmark Gangnam-gu before they start a new IT project, because Gangnam-gu has initiated numerous novel applications and information services in advance of other local governments. Even central government agencies and the Seoul metropolitan government consult with Gangnam-gu when they devise plans for IT initiatives for local governments. Gangnam-gu's IT development has been also recognized globally. One recent example is that the Intelligent Community Forum ranked Gangnam-gu as one of the Top Seven Intelligent Communities of 2006 (Intelligence Community Forum 2006), and some of the applications developed by Gangnam-gu have been exported to local governments in Japan.

Second, political leadership change was one of the key initiators for these two municipal governments' IT innovation. In 1995, Mayor Moon Yong Kwon, the first

mayor of Gangnam-gu elected by citizens,² started the organization-wide reform movement. IT innovation was the central focus of his reform efforts to transform the highly bureaucratic organization into a more efficient and citizen-oriented government. His reform was well-supported by the highly educated population in the district as well as the affluence of Gangnam-gu. Similar reforms were instigated by Mayor Anthony Williams who was first elected as the mayor of Washington D.C. in 1998 when the district was suffering from the unfortunate legacy inherited from the previous malignant administration. Upon his inauguration, Mayor Williams launched the drastic reform in the district government to convert the district from “a corrupt swamp of backward government” into “a prosperous city” (Lake 2006, 12). From the very beginning of the management reform, Mayor Williams has considered IT as the leveraging resource for the district government (Lake 2006).

Third, the governments of both Washington D.C. and Gangnam-gu are not completely autonomous from upper-level government units. Washington D.C.'s status is unique because it is a city, county, and state and also provides service to the federal government. Unlike other states, however, the residents in the district do not have political representation at the federal level, and Congress has the authority over budget decisions for the district government. Similarly, because of the long tradition of strong central government in Korea, many policies decisions in Gangnam-gu need approvals from either central government agencies or the Seoul metropolitan government. In both municipalities, therefore, building collaborative relationships with upper-level governments is one of the critical challenges in pursuing IT innovation.

The main data collection method for this study was conducting semistructured interviews with government officials in both municipalities.³ The interview protocol was composed of questions to investigate a broad array of IT management issues, such as IT planning, financing for IT transformation, outsourcing management, managing relationships with other governments, etc. In Washington D.C., the research team conducted interviews with 24 employees who were involved in IT management. 17 of the interviewees are employees of Office of Chief Technology Officer (OCTO) and the rest are the IT managers in the functional business units, such as the Department of Transportation and the Department of Motor Vehicles. Using the same interview pro-

2. In 1995 Korea enacted the new local government system in which mayors and province governors, who used to be appointed by the central government, are now elected by citizens.

3. The data collection in these two municipalities was a part of a research project *Comparative Studies on E-government Service in Local Government: Gangnam-gu, Korea and Washington D.C., U.S.A* conducted by the Center for Technology and Information Policy at the Maxwell School of Syracuse University in 2003 and 2004.

tolcol, the research team conducted a much wider range of interviews with the employees of Gangnam-gu. The total number of interviews with Gangnam-gu employees amounts to 43. This number includes five executive-level directors, 10 IT department employees, and 28 non-IT department employees who were involved in IT projects. In addition to the interviews, this study reviews the government documents relevant for understanding the IT governance models of the two municipalities, such as strategic plans for IT and reports of critical IT projects. The interviews with Gangnam-gu and Washington D.C.'s governmental officials were completed between December 2003 and November 2004.

FINDINGS

Two Differing Approaches

Gangnam-gu: Gangnam-gu's history of IT innovation illustrates the evolution of an IT governance model from a decentralized model to a business-centric federal IT governance model. When the government started the first organization-wide IT transformation in 1995, the functional business departments were the key players in initiating IT project ideas, drafting project plans, implementing projects, and operating developed information systems. At that time, the IT unit of Gangnam-gu was merely a small IT shop whose primary responsibility was maintaining personal computers and upgrading common computer packages. The IT team was composed of 11 employees, and only seven of them were IT professionals. Because of the regulation of personnel size cap maintained by the central government, it was challenging for Gangnam-gu to increase the size of its IT unit. In addition, since the Korean government pursues a generalist personnel system, the majority of public employees are generalists, with the exception of several specialized technical areas (e.g. tax, land registry, IT, etc.). This condition hampers the expansion of the IT human resource pool in Korean governments, especially local governments. These two limitations contributed to Gangnam-gu's adoption of decentralized IT governance in which non-IT units led the early stage of IT transformation in Gangnam-gu.

The decentralized governance was also reinforced by the mayor's strong support for a unique incentive system. He created a system utilizing the performance evaluation scores of individual employees for promotion and financial rewards to promote innovation and competition among employees as well as among the departments. This system was a powerful driving force behind the early development of IT. With the expectation of promotion and financial reward, Gangnam-gu employees were eagerly

searching for the areas that could be computerized. Even though most employees did not have expertise in IT, they actively contacted the IT vendors to look for innovative technologies which could be potentially applicable to improving the management and service delivery in Gangnam-gu. Such a high level of motivation compensated for the lack of in-house IT capacity. On the other hand, this situation inevitably led to duplicate investment, the incompatibility between business applications, and inability of sharing disparate databases. One example is that the Division of Transportation Guidance developed the vehicle location system to control its patrol vehicles monitoring parking violations by adopting a digital map and a geographic positioning system. During the same period, the Division of Land Registry created a geographic information system in which all the land registry data were input into a digital map. Because these two information systems were based upon geographic information data, they could have avoided duplicate investment for building two separate GIS-based systems, if centralized coordination had been available.

Even in this period, though, some of the key decisions were made through a centralized governing committee. The Information Facilitation Commission functioned as an IT steering committee to coordinate the IT projects initiated by the functional business units and strategically utilize IT resources. The vice mayor chaired the committee and the bureau directors, the most senior level managers, were the members. It also included civilian IT experts invited from the private sector and academia as support for decisions which required technical expertise. However, since this committee was not a permanently established body, it was not always possible to draw on the commitment from different bureaus. Even though Gangnam-gu maintained the CIO position which was first assigned to the Administrative Management Bureau director and then later to the Financial Management Bureau director, the CIOs could not be entirely committed to IT management because of their multiple responsibilities and lack of expertise in IT.

The decentralized IT governance in the early stage of Gangnam-gu's IT innovation was a natural decision contingent upon the above-explained organizational and institutional conditions. In spite of the problems caused by the lack of centralized coordination, the decentralized approach enabled Gangnam-gu to advance its information systems dramatically in the very short time period of about three years. Non-IT officials' active involvement in IT management created learning opportunities for them to gain capabilities for managing IT projects and using information resources. Additionally, the decentralized system allowed the functional business units to fully utilize their expertise in subject areas and promptly apply the ideas for IT innovation to implementation. These findings confirm that decentralized IT governance can be a useful governance model when IT strategy is focused on speedy innovation while sacrificing effi-

ciency and synergy effects of integrated approach to some degree.

In 2000, Gangnam-gu started the first stage of the STAR (Seamless administration, Two-way communications, Advanced IT applications, and Retailed information services) project, the purpose of which was to develop enterprise-wide management systems, such as the administrative support portal and the policy decision-making support system. Unlike previous information system development initiated by functional business units, the STAR project was the first attempt at integrating information systems to enhance the efficiency and compatibility of data resources. In terms of application development, the empowered IT unit (Division of Computer and Information), which was enlarged from a team to a division in 1998, initiated several application development projects which influence multiple functional business units. One example is the Internet Civil Application Issuance System. Citizens access this system through the Internet to download and print 11 civil applications by using their personal computers and printers. The types of civil applications covered by this application are not limited to one functional unit's business area, but multiple functional business units, such as the Division of Taxation, the Division of Construction Management, the Division of Land Registry, and the Division of Health Guidance. An IT manager explains the significance of integration efforts as follows:

“As we started the STAR project, we focused on service integration. Thus, the importance of data has been stressed, and we cared more about the data utilization aspect as well. It means that our staff can more conveniently share data and provide service on the Internet to residents while avoiding data duplication.”

The expansion of the Division of Computer and Information (hereinafter CID) is noteworthy. In 1998 the leadership of the government recognized the necessity of improving the centralized coordination function of IT department and enlarged the previous IT team into a division comprising three teams—planning team, development team, and education team. As of August 2004, the division was composed of 21 employees, and 10 of them are IT professionals. Its improved capability and increased authority facilitated the centralized maintenance of enterprise information infrastructure and the successful coordination of organization-wide integration projects like STAR. CID further initiated the first ISP [Information Systems Planning] in 2001 to develop a strategic plan to outline the roadmap of Gangnam-gu's future IT. Based upon the ISP which was developed by a vendor, the CID began the second stage of STAR, which was aimed at developing fully integrated information systems, such as the Integrated Information Portal and Knowledge Management System. A key contribution of the STAR 2 project was the development of a single sign-on system. Previously, an employee using multiple applications had to have multiple user IDs to access

different databases and applications. The single sign-on system made it possible for one common user ID to be used to access 60 information systems and, thereby, share the updated information across applications. It is not surprising that functional business units who owned the applications resisted the integration efforts. However, with the support from the mayor, the CID was able to overcome the resistance and complete the STAR 2 project. The integration of disparate systems contributed to providing integrated services to citizens as well as Gangnam-gu employees.

Based upon the success of the STAR 1 and 2, the CID conducted the second ISP, which set up a vision of "Ubiquitous Intelligent Government." One of the main objectives of this plan is to enable the field workers to access the E-government portal by using PDAs. Unlike previous IT projects, recent e-government projects are planned based upon the ISPs.

The enhanced planning and coordination functions of the CID indicates that Gangnam-gu's current IT governance is somewhat closer to centralized IT governance compared to its early IT governance model, but some of the areas still remain in the hands of functional business units. For instance, the GIS-based land registry information system is still run by the Division of Land Registry, even though this system is used by many other units and even citizens. The main reason is that the CID does not have the resources and expertise of updating and maintaining the land registry data. Interestingly, even the hardware maintenance, such as upgrading the server, is managed by the Land Registry Division by outsourcing the task to a private vendor. Even some new enterprise-wide IT projects are initiated by non-IT units.

The continuing tension between the CID and other units creates advantages and disadvantages. First of all, it is unlikely that the CID will be able to expand the size of its workforce in the near future because of the cap on the total number of employees within a local government. In order to continue the momentum of IT-based innovation, functional business units' continued participation in planning and implementing even enterprise-wide IT projects seems inevitable. One of the problems caused by decentralized IT governance is found in maintaining existing IT applications developed solely by functional business units. Functional business units tend to not adequately appropriate maintenance budgets after launching new services. The other potentially more serious issue is that functional business units will not be able to effectively handle situations in which the original vendors are out of business or are not willing to continue maintaining the applications. The CID took over the responsibilities of maintaining such applications, but it cannot be a complete solution due to the limited resources available in the CID.

The review of Gangnam-gu's IT development history reveals that the government has evolved its IT governance by adapting to the organizational and institutional limi-

tations and by maximizing the given resources to enhance the IT capabilities within a very short time period. Although there have been problems of decentralized IT governance and some of the problems still continue in the present, the ongoing efforts of modifying its IT governance model has been the crucial factor enabling Gangnam-gu to achieve the current success.

Washington D.C.: From its inception, IT transformation in DC has been guided by a strong centralized IT unit, Office of Chief Technology Officer (OCTO). Upon his inauguration in 1998, Mayor Williams implemented city-wide strategic planning, and OCTO drafted a transformation plan to overcome the challenges of IT management (OCTO 2002). OCTO identified three areas which needed immediate improvement: IT funding, management, and infrastructure. Based upon the early strategic planning, OCTO guided the IT development in the District. Duplications of investment due to the absence of multi-agency coordination mechanisms used to be a typical problem in the District. From the beginning of its foundation in 1998, OCTO has pursued a federal IT governance model in which principal decisions for IT were made by OCTO in cooperation with other key agencies. For instance, for management infrastructure programs, OCTO designed and implemented a centralized IT capital and operating budget and IT procurement processes for the entire district government to improve the effectiveness of using budget and IT human resources and achieve the efficiency gains earned from speedy and large-scale procurement of IT equipments and services (OCTO 2002).

One of the core missions of OCTO is developing and enforcing IT standards for all the District agencies and promoting the compatibility of information systems in the District government. In the interviews with the OCTO officials, they repeatedly stressed the importance of keeping the district standards and how seriously they enforce the standards to other agencies. Another important aspect of the District's IT governance is the centralized coordination. The Project Management Office under OCTO traces all IT projects implemented by the district agencies and authorizes IT procurement and capital project by using the PRIS [Program Review for Information Systems]. All 68 agencies need to go through OCTO for procurement of IT of which budget size exceeds \$25,000 per agency per year. In addition, the liaison officers in the Project Management Office regularly contact their agency clients to assist the agencies' IT management and development.

Such a highly centralized coordination and standardization requires a crew of many skilled IT experts. OCTO has successfully recruited top notch IT human resources due to the Congressional and executive supports, such as competitive salaries and a shortened hiring cycle (OCTO 2002). One deputy director of OCTO stated that when it comes to homeland security or emergency preparedness, OCTO is the first place to

receive a call. So the Congress and the White House are supportive of OCTO. In addition to the institutional support, the agency leadership has been effective in structuring the highly capable workforce in OCTO. Suzanne Peck, who has served as the Chief Technology Officer since 1998, explained her policy of "One Plus One." She herself has a resume filled with 25 years of IT executive management experience in Fortune 500 companies. She believes that if they hire a top quality IT specialist, then that person will bring in another "number one." The flexible personnel policy and the personal network of OCTO employees have enabled OCTO to form a so-called "Power Team." In the interview, Suzanne Peck repeatedly stressed, "We only want the best."

The centralized IT practices are observable in some key e-government projects. DC STAT is a GIS-based information system providing spatial information for various services. For example, they have used DC STAT for reducing crimes in "hot spots" where crime rates are high. The key objective of this project is to integrate the information from various agencies into one system to make it accessible to all agencies and citizens. However the current level of centralized coordination was not readily attainable when OCTO started the IT transformation in late 1990s. One OCTO program manager describes,

"A lot of agencies were resistant thinking that they were going to lose the responsibility for their information when it gets taken over to this big application that OCTO is implementing on them. I came up through Y2K where I had a bunch of agencies that I was responsible for. There was some tension there that really needed to be worked out. That's where true executive buy-in at the mayor's level came in. We are now at like, 98% of agencies have subsites. But they didn't come along willingly, because they are giving up a lot of responsibility to OCTO. OCTO is taking over their email accounts, directing their web traffic, directing their applications."

Certainly OCTO has been the centralized enterprise-wide IT department to set the standards for information systems and govern the IT budget process of all other agencies. However, the District's IT governance allows a certain level of self-governance to other agencies. Those decisions related to the entire district agencies, the budget and the standardization are made by OCTO in cooperation with agencies, but agencies other than OCTO still keep their IT management functions and develop and maintain their own applications. One IT manager in a functional business unit explains the relationship as follows:

"Because OCTO is the agency to the public, they host and maintain all the district agency websites to the public. We cannot create a website and allow the

public the access. Right now we work together with OCTO, trying to get some kind of a gateway, so we have some web applications the residents to access.”

The institutional support for OCTO has been the major impetus for enabling the IT-centric federal governance model. Unlike Gangnam-gu where the IT unit has remained as a middle management unit, OCTO from its creation in 1998 has been one of the cabinet-level offices. Such a difference in the organizational arrangement makes a difference in the IT unit’s authority and influence over IT decisions and the quality and size of in-house IT workforce. For instance, Gangnam-gu’s IT unit, the Division of Computerization and Information, is run by a total of 21 employees, while 18 employees work for a single GIS team within OCTO, and the total number of OCTO employees amounts to about 650.

DISCUSSION AND CONCLUSION

The analysis of two municipalities’ history of innovating IT shows two distinctive paths taken for the same purpose-innovating public organization with information technologies. Gangnam-gu started with a decentralized IT governance model and now is trying to strengthening the IT unit’s centralized coordination function by adopting strategic planning for IT. Meanwhile, Washington D.C.’s approach has been firmly based upon the IT-centric federal governance model in which OCTO administers the highly centralized coordination and standardization by utilizing its rich pool of human resources. Table 1 summarizes the findings.

Table 1. The Loci of Key Decision Makings in Two Municipalities

Key IT Decisions	Gangnam-gu (before 2000)		Gangnam-gu (after 2000)		Washington D.C.	
	Steering Committee or IT team	Functional Departments	IT Division	Functional Departments	OCTO	Functional Departments
IT Principles	V	V	V		V	
IT Architecture	n.a.	n.a.	V		V	
IT Infrastructure	V	V	V	V	V	
Business application		V	V	V	V	V
IT investment and prioritization decisions	V	V	V	V	V	V

Both Gangnam-gu and Washington D.C. have achieved their goals of IT innovation quite successfully by adopting two different paths, necessitating a discussion of the conditions which influenced the adoption of disparate IT governance models. First of all, as discussed in the literature, institutional and organizational contexts influence the choice of IT governance model. Gangnam-gu as a local government in Seoul, Korea, is regulated by the central government and the Seoul metropolitan government in arranging internal structure as well as implementing IT policies. The regulation over increasing the number of government employees has especially limited further improvement in the IT unit's human resources. In addition, the mayor's strategic choice of a strong incentive system to promote innovation contributed to the decentralized approach to advancing IT in Gangnam-gu. The learning opportunities experienced by all the agencies within Gangnam-gu have developed the capacity of non-IT employees to manage IT projects with a certain level of confidence. Although the current IT governance in Gangnam-gu is moving toward business-centric federal IT governance by strengthening the role of the CID, still much responsibility of managing IT is given to functional business units, and the situation continues to create the problems of maintenance failures and potential loss of efficiency gains by centralizing control over common IT resources.

Washington D.C.'s OCTO has been successful in centralizing enterprise-wide IT management to maximize the potentials of IT by standardizing the application of various information technologies and by holding control over IT budgeting and procurement. This arrangement of IT governance corresponded with the urgent need of the District when it started the IT innovation in 1998. The financial insolvency of the District required OCTO to run the information system to its maximum efficiency. The flexible personnel policy has been a critical factor facilitating the IT-centric federal governance model by enabling the hiring of highly-skilled IT experts for OCTO. The presence of a strong CTO is undoubtedly the most important factor in maintaining the strong coordination capabilities of OCTO. The difficulties of other agencies in hiring qualified IT professionals also contribute to federating IT governance into OCTO.

In sum, these two cases illustrate that the authorizing environment, overall organizational structure, and IT capabilities of non-IT units are associated with the choice of IT governance structure. This study also confirms that one single model is not necessarily a right arrangement for every government. Therefore the lessons learned from Gangnam-gu and Washington D.C. suggest that a successful IT innovation depends on how well a government creates a governance structure compatible with the given organizational and environmental conditions.

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