
E-Government and the Role of CIO*

Young H. Lee**, Jong S. Park***

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Key Words: e-government, CIO, balanced leadership, competitive gains

Abstract

The role of CIO is examined in the context of three successful e-government implementations in the U.S. The leadership role of CIO turns out to be crucial to the utilization of information technology for competitive gains: cheap government, speedy service, and increased satisfaction of citizens. A balanced leadership model emerges. An effective CIO should strike a balance between strategic and operational leadership roles, as well as between forceful and enabling leadership roles. To take a maximum advantage of IT, we propose government CIO positions with responsibility, power, and qualification specified along the balanced leadership model need to be created in Korea through legislation.

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** MIS Department, Hankuk University of Foreign Studies, Seoul, Korea
yhlee007@hotmail.com

*** Internet & Information Department, Seoil College, Seoul, Korea
jsoonpark@lycos.co.kr

I . Introduction

The era of e-government has come. In Chicago, crime rates are dropping due to the implementation of CLEAR (Citizen Law Enforcement Analysis and Reporting) system at the Chicago Police Department. At the heart of the system, there is an enterprise-wide relational database that can handle the mug shots, finger prints, DNA samples, nick names, and tattoos of crime suspects.

Accessing mug shots used to take four days. Now, four seconds with CLEAR. Pulling a rap sheet: from four hours down to seconds. Checking offenders' prison status and release dates: from 30 minutes down to one minute. A search for all records containing "bunny" tattoos takes four seconds and turns up 85 matches. A search on the nickname "The Russian" turns up a man with 14 arrests, mostly for assaults(Pastore, 2004).

When the locations of recent gang-related crimes are mapped through GIS (Geographical Information System), CLEAR reveals patterns that point to areas where rival gangs are likely to cross paths. Based on this information, patrol officers are redeployed in these locations. They are also supplied with the pictures of gang member suspects to look out for (Pastore, 2004).

The prediction concept seems to be working. Despite escalating gang hostilities

citywide, saturated locations have remained relatively quiet. Chicago's 2003 murder rate was down 7 percent from the previous year, the lowest since 1968. In the three years CLEAR system has been operating, crime rates in Chicago have dropped 16 percent; that's 34,564 fewer murders, rapes, robberies and other crimes against a person (Pastore, 2004).

Chicago is also solving crimes and closing cases at a higher rate. Chicago police detectives are solving nearly one out of three reported crimes, up from less than one out of four in 2001. The city exhibits the best crime-solving rates for the eight largest U.S. cities. Access to the centralized database anytime and anyplace empowers intelligence-driven crime-fighting. Information-driven policing is working.

Police departments in other cities such as Los Angeles and Washington D.C. are showing interests in the system. Federal government is interested also. The FBI, Bureau of Alcohol, Tobacco, Firearms and Explosives, and Drug Enforcement Administration are all tapping into CLEAR (Pastore, 2004). A momentum for a national model is building up, which will contribute to the anti-terrorism efforts by the Home Land Security Administration.

In Pennsylvania, an environmental protection system combined with a geographic information system deters businesses from polluting the environment. If hundreds of dead fish turned up on the

banks of a river five years ago, the inspectors at the state's Department of Environmental Protection had to make a lot of phone calls to figure out what caused the problem. They had to contact various offices dealing with different aspects of the environment—air quality, drinking water, waste management, mining, etc. While they wasted time and money trying to pull together the critical information from disparate systems, more fish were dying (Scalet, 2002).

Not any more. Nowadays, they can pull up a GIS application and see all the facilities that are upstream or downstream within five miles of the spot. The integrated system is also helping prevent some problems from happening in the first place. The department underwent a radical change of mind-set: from merely conducting inspections and levying fines to proactively monitoring and caring for the environment.

By reorganizing and providing integrated access to critical information, the Pennsylvania Department of Environmental Protection went beyond levying fines to proactively protecting the environment. A revolution in government is occurring, particularly in the environmental area: away from trying to catch people and punishing them after the fact, to more of a partnership model (Scalet, 2002). The government is working with the community to make Pennsylvania a more livable state. It is a win-win situation: the best interest

for citizens, industry and government resides in prevention.

The department embarked on a \$20 million project that eventually would be known as eFACTS: Environment, Facility, Application, Compliance Tracking System. The goal was to create integrated monitoring and management tools that would let employees manage their workflow, generate complex reports and view information spatially. As an added benefit, officials realized that much of that information could then be put online so that citizens who wanted to learn about pollution in their neighborhoods wouldn't have to sort through a dozen paper files at their local DEP office (Scalet, 2002).

The change in thinking has not been easy, but the technology is starting to pay off. With more informed employees, more focused outreach programs, better citizen participation and a software licensing agreement that could save the state hundreds of thousands of dollars, the environmental protection system is working. More than a dozen states have shown interests in using the system, which can be licensed through a private company that developed the system. The state of Pennsylvania gets \$250,000 per each state that signs on (Scalet, 2002).

In Texas, the state government developed a Web portal as a joint venture with private companies, and let the local governments share the benefits. Texas is a huge place,

and a constituent complained to his state senator why he had to travel 580 miles to get a government permit. State legislature passed a law in 1999 to create the TexasOnline Task Force, an oversight authority to oversee the development of Web portal in conjunction with KPMG, the prominent consulting company (Patterson, 2002).

Digital government in Texas can become a powerful tool for its citizens, many of whom have limited access to technology, speaking limited English and living near poverty level. It started with the online driver's license renewal program, and expanded into the credit card acceptance for online business activities such as property-tax payments and sales-tax payments. It is expensive to set up online payment system due to the security concerns: firewalls, encryption, authentication, intrusion detection, etc. By offering the system as a portal for city and county governments, the state is promoting the expansion of digital government. Local governments are using the state's infrastructure for the payment of various taxes, utility bills, voter registration and other services (Patterson, 2002). External economy is working: local governments do not need to duplicate the IT infrastructure investment.

Online access to filing and payment of various taxes, renewal of all type of licenses, and registration for public camp grounds means government access 24 hours

a day, seven days a week. Substantial changes are occurring in the way citizens interact with their government: Web portal has become a single point of contact to fragmented services. By improving the information transfer between city, county and state government entities, the TexasOnline will reduce duplication and overlap of government services (Patterson, 2002).

II. Chief Information Officers

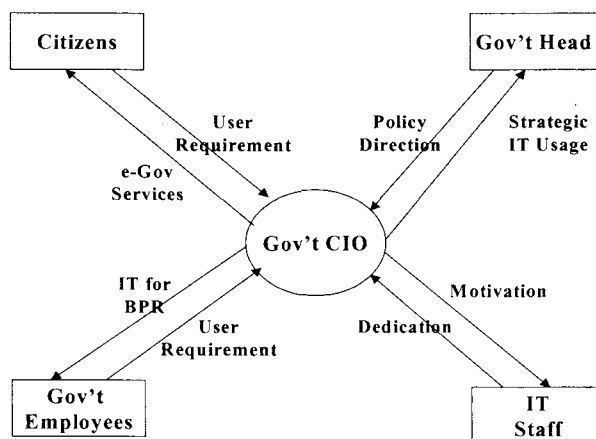
Chief Information Officers are the executives or senior managers in charge of information systems(Lee & Park, 2004). They plan, build, and operate information systems that support their organizations. At issue is how to utilize information technology(IT) for competitive gains at government. One may wonder whether the concept of competitive gains is appropriate for governments. We claim it is. Winning a reelection is the goal for any elected officials, and they need a strategy to achieve that goal. For the Republican Party in the U.S., it could be a small government with streamlined licensing processes. For the Democrats, it could be the efficient income redistribution through Internet such as scholarships, welfare payments, and free medical insurance for the poor. To do so,

CIOs have to function as a facilitator among the following stakeholders: citizens, elected official, government employees, and IT staff as shown in Figure 1.

the CLEAR arrest system went down (Pastore, 2004).

Labor savings total 193 full-time equivalents, including \$5.3 million in

Figure 1: CIO as Facilitator in IT Utilization



IT could become an enabling technology for business process reengineering(BPR). Consider the case of Chicago Police Department. For legal reasons, arrest reports must follow a carefully prescribed approval chain. Instead of paper reports going to the superiors' inboxes to sit and wait, automated reports are electronically routed as an XML file to the right people, capturing their digital signatures (Pastore, 2004).

Of course, the police department worked hard to win a grudging acceptance from the courts. A "copy and paste" function allows officers to use the same data from one report to the next. This function alone saves police so much time that one officer refused to default to the paper forms when

overtime pay reductions. Productivity gains allowed the elimination of 345 clerical positions. Most important, 90 once-deskbound officers have been redeployed to the streets (Pastore, 2004).

There are three factors that contributed to the success of CLEAR at Chicago. First, Chicago has a tradition of aggressive IT adoption. Second, the mayor of Chicago made CLEAR one of his top priorities. Third, the CIO of Chicago Police did a superb job.

Sworn in as an officer in 1995, the CIO worked the streets, and then in October 2000 joined IS as its director. Despite having no IT background, he realized the department was not leveraging IT the way it could. Since he worked the street, he

understood what officers needed to solve crimes. He put himself forward to help conceive and execute CLEAR (Pastore, 2004).

He also brought in other cops to work on development. He invited officers with an interest in IT to join him, and now has 18 officers working full-time on CLEAR development and training. There are hundreds of other police officers who have helped in application development, focus groups and user acceptance testing (Pastore, 2004). The system has been developed by users for users; it is not something some vendor has given as they would need it.

Chicago police has its own history of IT project failure. In 1999, it developed a crime reporting system without input from cops on the street, in part to meet Y2K deadlines. There was no buy-in and no testing by end-users, and a big-bang rollout did not work. The data-entry screens did not follow the logical (and familiar) order of incident reporting. It was hard to enter data, and the data it asked for was oriented more toward bureaucratic oversight than police work (Pastore, 2004).

To minimize resistance and make training simpler under the new system, designers made the interfaces consistent with the paper forms they replaced. They even adopted consumer shopping site designs: online help manuals are available; wizard-style Q&A prompts guide users through

data entry; single sign-on ability gets users into all authorized CLEAR applications, and rolling the mouse icon over record fields or boxes triggers pop-up help boxes (Pastore, 2004).

There was resistance to change, particularly among older officers. The average age of officers in Chicago is early 40s. Rigorous joint application development (JAD) sessions, acceptance-testing for each CLEAR application, and a 24/7 help desk have reduced grumbling.

The critical success factors can be summarized as follows: extensive end-user input in a joint application development process; interface designs to resemble established paper forms and user norms; use employees to train their peers on new systems (Pastore, 2004).

In case of Pennsylvania, the initiative came from the top. Soon after the new governor took office in 1995, he discovered that no one knew how many companies and governmental agencies were complying with environmental rules and regulations. A government program can not be managed without information on who is complying with the laws, so the governor instructed to develop an integrated environmental monitoring system (Scalet, 2002).

Not everyone was thrilled with the idea. Businesses were leery of what would be made available online and whether information would be misinterpreted. Department employees were skeptical too.

Not only would eFACTS initially mean more work? learning a new system, tracking new data? but two previous efforts to integrate the agency's 17 data silos had failed (Scalet, 2002).

Nevertheless, with the governor's full support, the CIO made it clear that failure was not an option. She kept the planning process open by hosting dozens of roundtable meetings with employees, businesses and citizens. She also split the project into manageable chunks, including converting legacy data (completed in 1997), launching the public website (in 1998) and rolling the system out to the department's many programs (Scalet, 2002).

In case of Texas, governor Rick Perry has consistently provided strong executive support for the development of e-government. The rollout of the state's comprehensive e-government plan required cross-agency effort and buy-in. It also took keen attention to building a policy and technical infrastructure that would carry the vision from concept to reality (Patterson, 2002).

Then the CIO Identified the stakeholders, created a sense of urgency (Kotter, 1995), looked at governance issues in terms of sharing power and infrastructure, and facilitated communication among the stakeholders.

Change management (Kotter, 1995) is another dimension that requires an effective leadership role by CIOs. The police

officers in Chicago were bought into the system since the CIO succeeded in changing their behaviors.

Since the IT irrelevance argument was presented (Carr, 2003), trade journals have been replete with counter arguments proclaiming that IT still matters as a competitive weapon. In case of e-governments, the concept of sustained competitiveness is applicable as follows: reelection and foreign capital inducement.

If the cost of providing government services is reduced substantially due to e-government, it could induce tax reduction. If the government services are available through Internet 24 hours per day, 7 days per week, voter satisfaction will result in the reelection of the e-government initiator. If the approval process is streamlined due to the utilization of information technology, it would expedite factory relocation and create jobs.

In this paper, we hold the view that IT still matters as a competitive weapon for governments. Though the IT irrelevance argument (Carr, 2003) may hold true in the long run, there would be individual cases where the competitiveness of a government is sustained by using IT intelligently. Though the competitive gain from an intelligent IT use may not last forever, what is important from an individual government's perspective is finding a way to use IT to improve efficiency and citizens' satisfaction. It may be akin to shooting a

moving target. Though difficult, it has to be done. And we assume the role of CIO is critical to this.

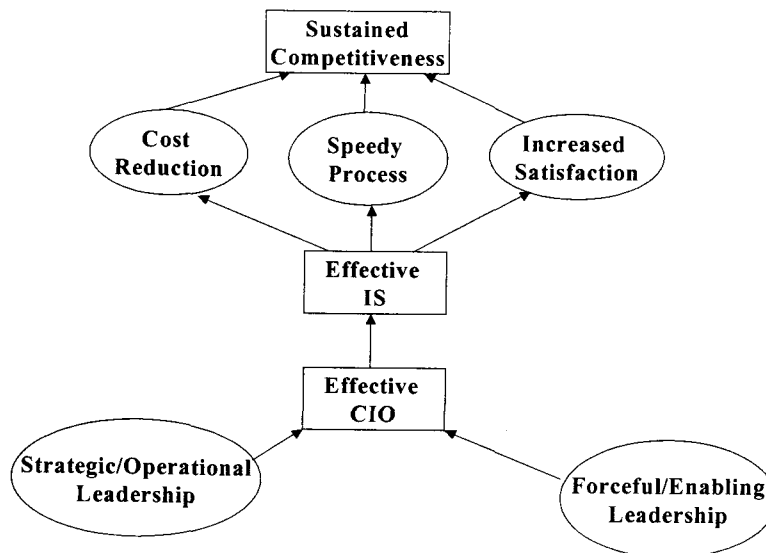
III. Balanced Leadership Model

In this paper, we propose that the sustained competitiveness of e-governments emanates from the three sources: operational efficiency, speedy process, and service differential. Providing government services is a labor intensive process, where IT can contribute to a substantial reduction of operational costs.

Departmental barriers in various approval processes are well known. Process reengineering utilizing IT could bring transparency to the approval process and shorten it: stove-piping is more relevant to government sector than the private sector. As more services are provided in the form of e-government, voter satisfaction will increase.

To build and operate an effective IS, we need an effective CIO. Finally, to become an effective CIO, she should strike a balance not only between strategic leadership roles and operational leadership roles, but also between forceful and enabling leadership roles. Figure 2 represents this idea.

Figure 2 CIO Leadership, Effective IS, and Sustained Competitiveness



Strategic leadership role by a CIO implies that the CIO should have a strategic vision on IT, a big picture, and lead her organization toward using IT for sustained competitive gains (Porter, 2001). Competitive advantages emanate from cost reduction, service speed, and service variety, as was stated above. Effective CIOs should know how to use IT to improve these areas: business process reengineering, collaborative computing with business partners, and e-commerce for citizens, to name only a few. They should also contribute to the development of IT-based business strategies. This is a strategic leadership. Understanding business is essential to the strategic leadership role played by a CIO (Lee & Park, 2004).

At the same time, CIOs should become an operational leader. They should know how to align their information systems with the business strategies of their organizations. They should know how to plan, build, and operate information systems efficiently. Technical expertise on IT is essential to this operational leadership. CIOs should understand the trends in software development, database, and Internet. They do not have to understand the nitty-gritty details in these areas. To manage information systems, however, they need to have a framework of analysis and know certain basics in these areas (Lee & Park,

2004).

CIOs promoted from the ranks of IT staff need to increase their business acumen. Otherwise, they fail to become effective CIOs, hence can not contribute to the effective usage of IT for sustained competitive gains.

Striking a balance between the two leadership roles is important. The idea of a versatile leadership¹⁾ is due to Kaplan and Kaiser(2003). According to them, many business leaders are lopsided. A strategic leader is good at drawing big pictures, but not so good at implementing the details. An operational leader fails to see a big picture, though may be good at running the information system efficiently. In an empirical context, they proved the existence of a strong correlation between the lopsidedness (failure to achieve a balance) and failure to become an effective leader. We found this duality quite useful in explaining the effectiveness of CIOs, since many CIOs from IT side would lack in strategic leadership and CIOs recruited from business side would lack in operational leadership (Lee & Park, 2004).

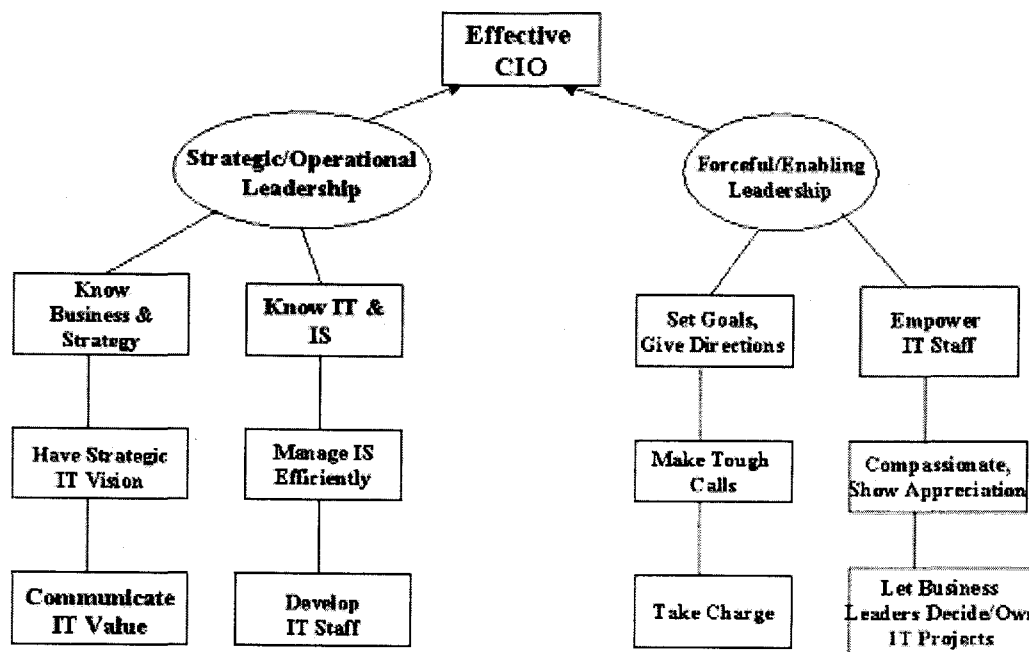
Another duality due to Kaplan and Kaiser(2001) is between forceful and enabling leadership styles. A forceful leader is good at setting goals, demanding answers when the goals are not met, and making tough decisions. An enabling leader is, by

1) Versatile means to turn around or change positions depending upon a situation, according to Kaplan and Kaiser(2003). For all practical purposes, versatile leadership is synonymous with balanced or flexible leadership.

contrast, good at delegating power, listening to the subordinates, and empowering them. Here again, Kaplan and Kaiser(2003) found a lopsidedness to the

to motivate IT staff, since their dedication is essential to developing and operating modern information systems that have to be complex. Figure 3 represents this idea.

Figure 3 CIO Leadership Model



detriment of an effective leadership: too many leaders are forceful, yet lack in enabling leadership. Enabling leaders are afraid to make tough calls, hence fail to become effective leaders. To function as an effective leader, one should know how to act forcefully, and at the same time, to enable others, depending upon a situation(Lee & Park, 2004).

We found this forceful/enabling duality useful to explain the effectiveness of CIOs. They need to make tough decisions when it comes to managing IT projects and vendors. On the other hand, CIOs should know how

IV. Concluding Remarks

In order to take a maximum advantage of IT in the 21st century digital government, intelligent planning, collaboration and cooperation among the decision-makers at the national, provincial and local levels are needed. For this, we propose that CIOs need to be appointed at each level of the government with due responsibility, power, and qualification specified along the balanced leadership model presented above.

There is no CIO with a broad power to implement cross-departmental information systems, reporting directly to the president of Korea. Nor there is a CIO at each department of the national government, reporting directly to the Minister. The same is true with provincial and other local governments. The CIO system has not been introduced to Korean government, though the same is not true with private sector. The lack of government CIOs may be one of the reasons why digital government is lagging behind in Korea: 32nd in a recent world-wide ranking, far behind Taiwan and Singapore. In case of the availability of high speed Internet connections, and the number of Internet users, Korea claims to be the first.

In case of the United States, Clinger-Cohen Act was passed in 1996 that required federal agencies to appoint CIOs. In December, 2002, President Bush signed the E-Government Act into law. The new law created a new office within the OMB (Office of Management and Budget), the government agency under the direct control of White House. The law also established a separate, \$345 million E-Government Fund for interagency projects, mandated basic standards for federal websites and privacy impact assessments for new systems, and called for improved information security measures (Datz, 2003).

The new office will be led by an administrator appointed by the president.

That person will also head the federal CIO Council, an interagency group of 60 or so CIOs and deputy CIOs. The initial legislation called for the creation of a CIO position within the OMB that would require Senate confirmation, but White House objected to it (Datz, 2003). Though the administrator has many responsibilities of the CIO position, his profile would be raised if he becomes the U.S. CIO, like the Surgeon General. A person holding that title statutorily would be in a stronger position to elevate IT to a higher level, helping to ensure that technology strategy is part of the federal government's management strategy.

In case of the state governments, there are CIOs reporting directly to the governors. The associate director of e-government in the OMB, the de facto federal CIO, is traveling the country to spread the message of interconnectivity, inter-jurisdictional cooperation and systems integration. He carries an open-door invitation to state and local government CIOs, soliciting the kind of collaboration unknown before Sept. 11(Datz, 2003).

The ultimate goal of e-government is to make it easier for citizens and businesses to access government information and services. Digital government should also encourage interagency IT initiatives that would consolidate redundant systems, decrease paperwork, increase productivity and save money, while improving service to

citizens.

It is about making government citizen-centric so that citizens visit websites to get information about unemployment benefits, comment on proposed clean air rules or apply for an import license. Citizens save time, and the government gets more for its IT dollars.

Information technology can be a powerful tool in changing the way governments conduct their business. They need CIOs who must set a new tone and develop a strategic plan to re-brand government in the collective mind of the public it serves..

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