IT and Administrative Innovation in Korea: How Does IT Affect Organizational Performance?

Tobin Im,* Hye Young Shin, Eun Young Hong and Yang Ki Jin**

Abstract: Because of Korea's nationwide Internet capacity, information technology is accelerating the development of electronic democracy and the informatization of public administration in that country. This article analyzes how information technology affects organizational development, using the Korea Procurement Service as a case study. Based on Rockart, Earl, and Ross's model, this study focuses on four aspects of redesign-operational redesign, support redesign, managerial redesign, and network process redesign. By exploring the link between information technology and other organizational factors, this article explores the effect of the introduction of an electronic system into this agency, which traditionally had a reputation for little corruption and red tape in Korea. Relying on previous studies and statistical data, this study explains the extraordinarily high performance of the Korea Procurement Service and analyzes the effects of information technology on the achievement of service efficiency and corruption control.

Keywords: IT, organization, procurement

INTRODUCTION

With the rise of the information society, the role of government has also changed. In Korea, because of its nationwide Internet capacity, information technology (IT) is accelerating the development of electronic democracy and the informatization of public administration. E-government can be defined as the application of information and communication technology to achieve better government. It is not a goal, but rather a

* Tobin Im is a professor in the Graduate School of Public Administration at Seoul National University. His research and teaching focuses on organizations, comparative public administration, human resource management, and ethics. He has published many books, including *Action Theory for Local Organizations* (2004), and numerous articles in academic journals.

** Hye Young Shin, Eun Young Hong, and Yang Ki Jin are graduate students in the Graduate School of Public Administration, and their research is supported by the BK21 program.

Manuscript received December 2006; out for review December 2006; review completed January 2007; accepted February 2007.

The Korean Journal of Policy Studies, Vol. 21, No. 2, 157-175 (2007)

tool that can be used to transform society by enhancing administrative efficiency and effectiveness and increasing citizen participation in—and the transparency and accountability of—the policy-making process (OECD, 1999).

However, the application of IT to public administration can be a double-edged sword. Despite the many benefits that IT offers, great challenges are posed by the dynamics, complexities, and risks of global enterprising. Unless provisions for continuous upgrades and enhancement are built into IT systems, the ability to perform procurement functions in a timely and secure manner will be diminished. The challenge for IT units is thus to align technology with organizational goals and to employ specialized personnel to deal with it.

The Governmental e-Procurement System (GePS) in Korea is one of the most successful cases of public-sector reform. It was adopted based on interagency collaboration and coordination from the top. The successful adoption of the GePS was made possible by the efforts of the Korea Procurement Service (KPS) to reform the organization in response to a rapidly changing technology environment. While private firms generally can reshuffle their organizations and reduce manpower, public sector organizations in Korea have rigid restrictions on their ability to affect organizational change. Within the limited scope of reengineering that is possible, the KPS had to gradually restructure its tasks, people, and organization to meet the new demands of IT.

In this respect, this case study of the KPS will discuss the following issues related to the role of IT in procurement:

- How IT influences organizational change
- How the advantages of IT can be maximized in the public sector
- How a central procurement organization takes on new roles as it employs an electronic procurement system

There are two opposing views about the actual changes that IT has brought: One supports the idea that organizational change has occurred, whereas the other denies that IT has had any effect. It is possible that IT has caused significant changes in management processes, but that does not necessarily imply organizational change. This study will look at the innovations implemented by the KPS over the last several years.

FRAME OF ANALYSIS

Herald Leavitt (1965) proposes a model of organizational analysis that comprises structure, people, tasks, and technology change. Leavitt defines an organization as a balancing act: If any one of these four variables changes, the others must also change

in order to maintain balance in the organization. Rockart and Morton (1984) add a fifth variable to the balancing act: organizational processes. They argue that management processes are the glue that holds the organization together, and they surround the four boxes characterizing organizations with a line representing a permeable membrane. This membrane leaves each element exposed to the external environment—thus, the organization's strategy is directly affected by the environment, while individuals and the organizational structure are affected less directly. Lucas and Baroudi (1994) argue that new organizational design variables are made possible through information technology: structural variables (e.g., virtual components, electronic linking, and technological leveling), work processes (e.g., production automation and electronic work flows), and communications (e.g., electronic communications, technological matrixing, and electronic customer-supplier relationships).

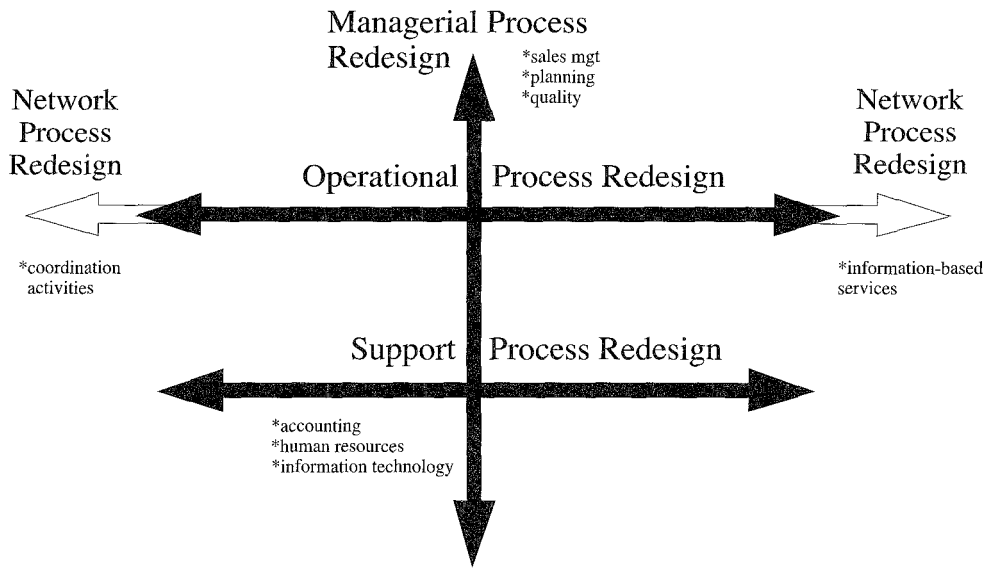
This paper begins with the assumption that organizational structure is linked to management processes. Changes in management process as IT was implemented alongside the procurement process encouraged the components of the KPS—people, tasks, structure, and strategy—to divide electronic tasks and to work in partnership with various people in different way. Therefore, the rigid and bureaucratic KPS was forced to change.

Thomas Powell and Anne Micallef (1997) suggest that the advantages of IT dissipate rapidly without the integration of IT with the agency's infrastructure for human resources and business complementary. Management processes should be created to foster conditions in which IT can produce sustainable advantages. From this perspective, this paper will examine changes in the workflow of the KPS using a framework based on the model proposed by Rockart, Earl, and Ross (1996):

- **Operational process redesign:** Reengineering to remove unnecessary steps from basic transaction-oriented operational processes. Operational and management processes fall within the overall business process. Operational processes embody the execution of tasks that make up the activities of an organization's value chain. In effect, operational processes constitute the "doing of business."
- **Supportive process redesign:** Providing appropriate education and hardware to enable all members to do business effectively with regard to information technology.
- **Managerial process redesign:** Rethinking internal managerial information flows to provide greater access to data at all levels of management. Managerial processes are activities associated with the administration, allocation, and control of resources within organizations.
- **Network process redesign:** The development of new and improved ways to reach, service, and retain customers.

It is worth noting that all of these redesigns involve *major process* change in most cases. In other words, these four processes are conceptual and theoretical, so that they are not mutually exclusive nor clearly definable especially as far as IT effects are concerned.[1]

Figure 1. Rockart, Earl, and Ross's Analytical Framework



ELECTRONIC PROCUREMENT SYSTEMS IN THE KOREAN GOVERNMENT

The Conceptual Framework of the GePS

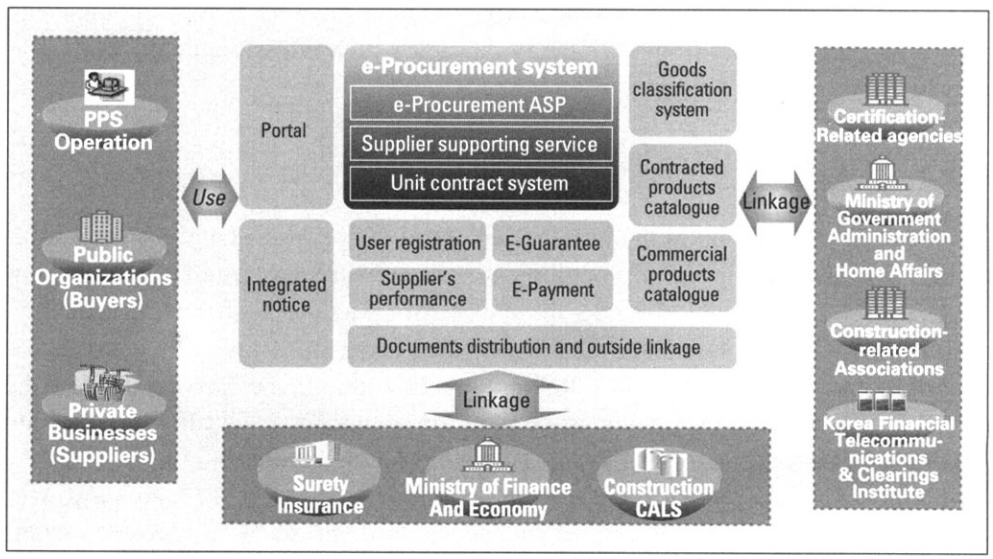
In 1995, the KPS, an agency belonging to the central government, conceptualized e-procurement by elaborating the Procurement Electronic Data Interchange (EDI) Plan. Based on this plan, a pilot research project commenced in 1997. The visible result of the EDI plan was the Government E-Procurement System. The cost of devel-

1. In the framework, "management process" and "operational process" refer to the internal management of an organization and its processes, respectively, including both internal and external aspects. In this paper, I use "management process" for to refer to human resource management and "operational process" to refer to the technical aspects of tasks. I thank a reviewer for the comment in this regard.

oping the GePS was about $22.4 million—$1 million to build the process and $21.4 million to build the system.

The GePS provides information on public procurements by central governments, local governments, and other public agencies. It is a public cyber-marketplace in which a single gateway allows suppliers and buyers to meet and conduct a range of electronic business activities. Figure 2 shows the architecture of the GePS. The GePS is intended to help public organizations perform procurement in terms of contract requests, bids, contracts, payment requests, and follow-up management; serve as a single point of business registration for public procurement; provide information on companies regarding business identification certificates, national tax payment certificates, and qualifications; report contract performance; issue notices related to procurement; and manage an e-shopping mall for the KPS's supply of contracted products (Seong & Lee, 2003).

Figure 2. Conceptual Framework of the GePS



The business process of the KPS has significantly changed since the adoption of the GePS. In the past, in order to participate in the bidding process, companies had to visit organizations scattered nationwide, register with every organization to vouch for their bidding qualifications, and submit the same documents on bidding and forming contracts. Furthermore, they had to spend a great deal of time reading official gazettes and newspapers to get bidding information. Moreover, because they had frequent face-to-face transactions, there was a growing concern about possible corruption.

In this context, there was a crucial need to make the procurement process electronic. Automatic processing and online information sharing on a real-time basis were expected to elevate the transparency of government procurement, increase corporate productivity, and reduce transaction costs significantly. For example, bidders would not need to visit government offices and submit the same documents over and over again. They can not only bid and form contracts but also apply for certificates and submit annexed documents.

The GePS is a network system that connects public agencies and vendors. This network system comprises 53 external systems that are managed by outside institutions. The Government for Citizen (G4C) System provides tax records and necessary information for registration. The National Finance Information System provides real-time information on finances of government agencies. The network comprises six construction-related associations, which provide information on contract bidders; 10 insurance corporations, which receive contract deposits; six certified authentication institutions, which help to verify the digital signatures; the Korea Financial Telecommunications and Clearings Institute, which provides services for e-payment with 15 commercial banks; and the National Computerization Agency, which issues the public key infrastructure for e-bid cryptogram.

The Customer Is the Principal Beneficiary

Since the introduction of the new system, the KPS has managed to realize revolutionary performance in the e-procurement service based on customer relationship management (CRM) in 2004. Under the slogan "In a way you want, anytime and anywhere," the KPS has implemented differentiated and more convenient services for each customer group through its CRM project. In addition, the KPS established the first Web call center among public institutions to enhance service quality by providing telephone responses, video consulting, and screen-sharing guides.

Moreover, it constructed an ontology system through an automatic search and standardization of differently categorized catalogues. In doing so, it has boosted e-commerce by enabling everyone to have easy access to product information. In 2005, it implemented "ubiquitous e-procurement" by opening a mobile service whereby people can get procurement information and participate in bidding. Entrepreneurs can now make e-bids while traveling.

Time Savings

The Internet—and all of its global subnetworks—has enabled better, faster, and

cheaper business operations. Geographic distance and waiting time do not matter any longer. The cost, speed, and capacity of data handling, together with its 24/7 access, define the advantages of the Internet and its value for e-commerce.

Through standardization, digitization, favorable weighed-size value rations, and the Internet, high technology has enabled the KPS to produce faster, cheaper, and better business results through (1) faster interagency response, (2) lower costs, (3) more innovative, higher-quality services, (4) greater transparency. Tables 1 and 2 show how much time has been saved through the introduction of the EDI. Estimating time saved per unit transaction and the volume of work, Table 1 shows the total amount of time saved in terms of KPS employees' work time. It goes up to 6,683,966 hours per year.

Table 1. Time Saved by KPS Employees (Hours)

	Transactions per Year	Before EDI	After EDI	Time Saved per Unit	Total Time Saved
Publication of bidding	5,366	50 days	50 days	0	
Procurement demands	213,238	5.0	0.5	4.5	959,571
Reception of invoice	180,401	5.0	0.5	4.5	811,805
Demand of Items	240,092	4.0	0.5	3.5	840,322
Transfer of items and verification	273,719	6.0	3.0	3.0	821,157
Payment from demander	324,011	7.0	0.5	6.5	2,106,072
Payment to suppliers	152,672	8.0	0.5	7.5	1,145,040
Total time saved	1,389,490	35	6	29.5	6,683,966

In the same way, Table 2 shows the total amount of time saved for companies doing business with governmental agencies. This amounts to 9,313,352 hours per year. This is phenomenal. Simply adding the amount of time for the both sides, the EDI has resulted in time savings of 15,997,318 hours per year—that is, 1,999,664 business days per year.

Table 2. Time Saved by Companies (Hours)

	Transactions per Year	Before EDI	After EDI	Time Saved per Unit	Total Time Saved
Reception of item demand	180,401	24.0	8.0	16.0	2,886,416
Modification of demand or notification	59,691	40.0	8.0	32.0	1,910,112
Delivering items	273,719	24.0	16.0	8.0	2,189,752
Invoice and reception of payment	72,721	40.0	8.0	32.0	2,327,072
Total time saved	586,532	128.0	40.0	88.0	9,313,352

Lower Costs

In addition to the costs of introducing the system, maintenance costs are estimated at $2.4 million per year. The cost is mainly allotted to wages for outsourced programmers and counselors in the call center. They consist of 34 programmers and 34 counselors, with 17 people from the KPS. They assist the manager and operate the programs and the hardware of the GePS.

However, the GePS has realized annual transaction cost savings of $2.7 billion as a result of electronic processes and integrated information. In particular, 90% of the total amount of business expenses was saved in terms of time and transportation. Public organizations saved $281 million, primarily because of the reduced burden of information acquisition and reduced travel costs to public offices.

Table 3. Estimation of Cost Savings from the GePS

Components	Work improvements	Benefits (million dollars)		
		Private	Public	Total
Simplified process	Cutting down on red tape, etc.	104	33	137
Standardized process	Using the standardized way of contracting, etc.	437	165	602
Digitalized process	E-bidding, bid notice on the Internet, etc.	226	46	272
Integrated data sharing	Obtaining information in the single window, etc.	1,714	37	1,751
Total	2,481	281	2,762	

Source: Task force for the GePS project, January 2002.

WHAT HAS CHANGED SINCE THE INTRODUCTION OF THE EDI

The KPS has a special budgetary status—similar to that of a private company—because it generates its own revenue and executes its own budget, separate from the central government revenues and expenditure structures. This peculiarity was favorable to the introduction of the EDI plan. The EDI—and the GePS in particular—has brought changes in the organization's operational, supporting, managerial, and network processes.

Operational Process Redesign

Changes in the Organizational Chart

In 2002, the Division of Informatization Planning was created within the KPS. Because the Ministry of Internal Affairs now renowned as tightly controls all agencies' organizational charts and total number of employees, the creation of this division was made possible by rearranging the other divisions. This is the way that agencies within the Korean government are typically restructured, as one of Ministry of Internal Affairs' functions is to fight against bureaucratic expansion.

It is worth noting that before the inauguration of the GePS, a Division of Planning already existed. This division was in charge of planning all strategic change, including the upcoming informatization of the KPS. The newly created Division of Informatization Planning is charged with ensuring the normal operation of the GePS and preparing for further development in that area. This division is known for its capacity of spinning itself off whenever a new mission is formulated. For example, after mandating the importance of standardization for every item subject to procurement, the Division of Electronic Catalogue was created.

The introduction of the GePS has brought substantial changes in other divisions' work as well. The decline of the Division of Enterprise Accounting is an excellent example in this regard. Its principal mission was to verify accounting summaries of enterprises applying for bidding, but with the GePS, this function is no longer necessary. From the database of enterprises that the GePS has incorporated, one can easily check the business credit of any enterprise on a real-time basis. Before, it was difficult for the KPS to distinguish good enterprises from bad enterprises because, seeing all of the wonderful business opportunities that were available, collapsible corporations or enterprises would form in order to try to sneak into the bidding process. Consequently, the Division of Enterprise Accounting was eliminated.

This is not necessarily a criticism of the organization of the KPS. As the Korean economic and business sector has evolved, new business areas have emerged for the KPS, too. Examining IT-related items is a huge task, considering the variety and speed of technical innovation in the IT sector. Because public agencies are purchasing more and more services from the private sector through bidding, it was necessary to standardize the bidding process. These are typical examples of new mission areas that the KPS faces; as a result, the KPS could not be downsized after the introduction of the GePS.

Some may argue that this kind of new mission has served as justification for keeping the existing organizational size—that is, not downsizing because Korean bureaucrats fear losing their jobs if the size of the agency is diminished. One cannot deny this

bureaucratic inertia in the KPS, but it is also understandable that new business areas have appeared. Currently, the KPS has five headquarters, one central inventory office, 11 regional offices, three branch offices, and five overseas representatives.

Centralization versus Decentralization

Centralization and decentralization have been important issues in the history of the KPS. The location of all (or parts) decision-making points is critical to ensure efficiency and to guard against corruption. This study found that, increasingly, these responsibilities are being distributed to both local organizations and to the central IT unit, which fits well with what Handy (1989) calls a "federal" structure. Handy describes the federal organization as one that follows the political model of the division of power between a central authority and local governments (e.g., the federal government and the states in the United States). This model allows for a significant measure of autonomy at the local level in business organizations, but also the "scale" that is necessary for organization-wide planning, resource allocation, centralized purchasing, and other benefits.

Both, however, as noted in the central ellipse in the exhibit, provide many advantages. Decentralization of some decisions fosters user control over IT priorities and business-unit ownership of their systems, for example. On the other hand, economies of scale and control of standards can only be gained from centralized activities.

Hodgkinson (1996) illustrates a federal organization that delegates some responsibilities to the center and many more to local organizations. What ties all of this together is a well thought-out IT vision, effective leadership, and a groupwide IT strategy and architecture. These, in turn, enable the benefits of both centralization and decentralization and allow strategic control and synergy throughout the organization. Moving from the status quo to an effective federal organization, however, is not easy—especially in formerly decentralized organizations. Importantly, though, once a federal structure is in place, it can easily be modified as the requirements of the host organization change and as technological learning evolves.

Thus, the federal model is a relatively stable structure (Earl & Feeny, 1994) Past work on federal IT structures has assumed a multidivisional context. However, single-line businesses are also discovering the advantages of federalism. In this model, there is devolution of systems analysis and consulting activities to departments, functions, or processes and a unifying central responsibility for strategy and operations. In other words, the federal structure helps to achieve alignment with the business, together with economy of scale and architectural integrity.

The introduction of the GePS has resulted in these two contradictory effects in the field of procurement in Korea. More agencies and local governments are using the

GePS, as it is easier and less expensive than doing procurement in their own way. The Division of Informatization Planning established technology standards for implementing the architecture. This requires constant screening and testing of technologies to determine which technologies meet organizational needs for integration and support. The rapid pace of change in information technologies means that the division must develop the ability to establish, support, reevaluate, and, as appropriate, change technology standards. What is extremely clear today is the movement toward an increased emphasis on standards for both cost and effectiveness. The time, energy, and expertise needed to make appropriate procurements is driving procurement agencies to use the EDI system rather than proceed with decentralized procurement procedures. Thus, centralization has occurred in terms of the uniformity and standardization of the procurement processes that most agencies rely on.

Centralization does not mean that the KPS headquarters decides or influences who will win contracts—on the contrary, each agency has more autonomy in their decision to use the GePS when making purchases. When agencies use the GePS, it is the software that makes the choice. More public agencies are using the EDI system, not only because of its simplicity and cost but also because transactions processed through the EDI system are exempt from audit. The latter point is particularly important, as many agencies have complained about the bean-counting method of auditing that the Korea Audit Office uses regularly. In this sense, procurement processes are decentralized across Korean governments and agencies.

Supportive Process Redesign

The KPS is a relatively small agency within the Korean government. It includes 943 employees, of which 407 work at the headquarters, 88 work at the central inventory office, and 448 elsewhere (e.g., regional offices). Traditional bureaucracy, by definition, cannot support the GePS. The transformation from hierarchical bureaucracy to network organization is possible only if people change their perceptions and acquire the appropriate skills. Obviously, the changes that the KPS faces have resulted in large gaps in the technical skills of staff members. Neither of these skill sets is easy to develop within the current ranks. Some estimate that up to 50% of the existing IT personnel will not be able to make the technical transition-much less be able to obtain the appropriate business skills. There is, as yet, no consensus on the appropriate way to carry out the transition of skills.

Another solution to this shortage of qualified staff is to recruit talented young people. However, the Ministry of Internal Affairs (now called the Ministry of Home Affairs and Decentralization) keeps tight control on the bureaucratic expansion of all

agencies in the Korean government. In other words, the KPS has no discretion to increase its total number of employees, but it also cannot fire personnel because of the strong job protections provided by the Korean civil service system. Furthermore, the KPS cannot provide the Ministry of Internal Affairs with evidence to support the necessity of increasing its staff, as some people believe that IT has the effect of diminishing the need for staff for the same tasks. As a result, the KPS has remained relatively stable in the number of staff members employed over the years (see Table 4).

Table 4. Number of KPS Staff Members

Job series	1998	1999	2000	2001	2002	2003	2004	2005
General administrative	704	663	662	662	678	678	698	726
Technical	295	260	260	260	244	244	233	211
Political appointee	1	1	1	1	1	1	1	1
Special tasks	12	11	11	11	11	11	11	9
Contracting	0	0	1	1	1	1	1	1
Total	1,012	935	935	935	935	935	935	948

There is no way for the KPS to solve its staffing problem other than to shift the work and training of existing staff members. To that end, the KPS created a training center to allow staff to acquire new skills, and it introduced a certificate program in contracting. Through this training and certificate system, employees significantly enhanced their work skills. For example, an expert procurement training course at the head office has now been expanded to training centers at the regional offices. The number of trainees increased from 1,607 in 2005 to 6,931 during the first half of 2006. Those who completed the training course, as well as those who have earned the certificate, play a role as change agents within the KPS. Thus, an internal partnership between change agents and those who need to develop skills has been established.

The outsourcing of some IT-related jobs to computing service firms such as SDS, an affiliate of Samsung, supports the EDI plan, alleviating some of the skill shortages in the Division of Information Planning and relieving management of the need to oversee tasks that are not considered competitive strengths or core competencies. Because of their economies of scale, these outsourcing companies can, in principle, provide more reliable, cost-effective support than in-house units while allowing top IT management to focus on strategic priorities.

However, managing—or more precisely, supervising—the work done by outsourcing companies is quite different from deciding to outsource (Earl, 1996). This requires IT staff working at the KPS to be at least as skilled as the outsourcer in each key area. They need to be able to understand customers as well as negotiators and derive satis-

faction from seeing a job done well—not just doing it. This is a slightly different breed of manager than has populated IT departments in the past. A critical skill is the ability to recognize of whether a vendor relationship is purely transactional and contractual or more strategic and collaborative (Henderson, 1990). Vendors, as much as customers, have suffered from confusion on this point.

Managerial Process Redesign

Before the introduction of the GePS, the KPS was a bureaucratic organization, like other agencies that could be characterized by a closed and authoritative relationship with outsiders. In the past, the KPS was exclusively in charge of the whole process of procurement from beginning to end. The EDI transformed this bureaucratic organization into a network organization. Under the new system, the boundary between the KPS and its environment has become more fluid and ambiguous. Managing in the traditional bureaucratic way does not work any more.

It is important to note that the technical maintenance of the GePS is subcontracted to Samsung because KPS officials cannot handle this advanced IT facility. The most dramatic aspect of the change has been an increased reliance on integrated packages. The KPS recognizes that it does not have the time, money, expertise, or inclination to develop large, integrated systems in house. Therefore, the agency purchased software from Samsung. Package implementation is decidedly different from in-house development. It is enough for the Division of Informatization Planning to understand the system, adapt it to the platforms it can utilize, and troubleshoot code or table-driven procedures. More importantly, because packages inevitably require changes in business processes, the division must work even more closely with the agency's functional managers, who are responsible for making the systems work in practice and conceptualizing future directions of development.

The biggest change the KPS has experienced has been the shift from being primarily a "doing" function to acting as a more business-centered advisory and management function. In large organizations, primary role of IT management is to (1) ensure that line managers at all levels understand the potential of IT and make the most effective use of IT resources in carrying out their strategies, and (2) provide advice and expertise to ensure the effective implementation of business strategies and tactics. In other words, IT management works with line management to ensure that the business is doing the right things with IT and is doing them right. This includes understanding and interpreting technology trends; working with key line managers to help them develop IT-enhanced strategies; educating and consulting with line management to ensure that the strategic direction is carried out; taking responsibility for—or support-

ing, at the very least—effective process innovation; developing relationships that permit useful internal partnerships; managing suppliers to whom parts of IT have been outsourced; and developing and managing IT human resources.

Network Process Redesign

The KPS quickly recognized that internal partnerships were not enough to operate the EDI in the most efficient way. Network organization works to the extent that all actors in the network have the same level of skills. For this reason, the KPS opened its training courses to external partners such as enterprises.

There is intensive information sharing between the KPS and other actors. Agencies and enterprises have access to the EDI at any time and participate in bidding, so long as they satisfy the bidding conditions established by the KPS. The EDI has the effect of removing the traditional barrier to the KPS bureaucracy. Because the KPS is located in the center of the EDI, buyers and sellers belong to the same network. The transparency that the EDI has brought to the process of transactions makes every actor play the bidding game without doubting bureaucrats' corruption—the unsolvable problem until the introduction of the GePS. This government-to-business network has increased interactions between the public and the private.

About 37,000 public organizations belong to the GePS. They are potential or actual buyers of merchandise, services, or construction that will provide business opportunities to companies. The Law of Procurement requires 4,755 state agencies, 6,434 local governments, and 10,320 educational agencies to observe the KPS's requirements for procurements. Another 803 public corporations and other diverse organizations are voluntarily involved in the EDI network, although the law does not require them to do.

Table 5. Number of Demanders

	Total	Clients Regulated by Law			Voluntary Clients	
		State Organizations	Local Autonomous Entities	Educational Committees	Investment Institutions	Others
No.	33,516	4,649	6,327	10,084	788	11,688
Percent	100	13.8	18.8	30.1	2.4	34.9

Source: PPS (2003, p.12).

For companies that want to do business with the government, networking through the EDI becomes even more important. Before the EDI was implemented, one of the company manager's jobs was to make friends with KPS staff members in order to

obtain bidding information, as well as to get the bidding. This kind of lobbying was considered typical corruption, but it was practically impossible to systematically prevent it because of confidentiality. The EDI reduced the KPS's discretionary power in the procurement process so that businessmen and women no longer feel that it is necessary to lobby in order to gain favor with the KPS. The transparency that the EDI has brought has remarkably changed the relationship between the KPS and would-be bidders from a hierarchical relationship to an equal one.

In order to participate in the bidding process, companies must accumulate business credit history and register within the period that the law requires. The KPS can now check a company's credit history based on data from such diverse sources as banks, business credit information companies, and the tax administration. Companies cannot camouflage their credit histories any more. The number of registered companies increased to 179,077 in 2004.

Table 6. Number of Registered Companies

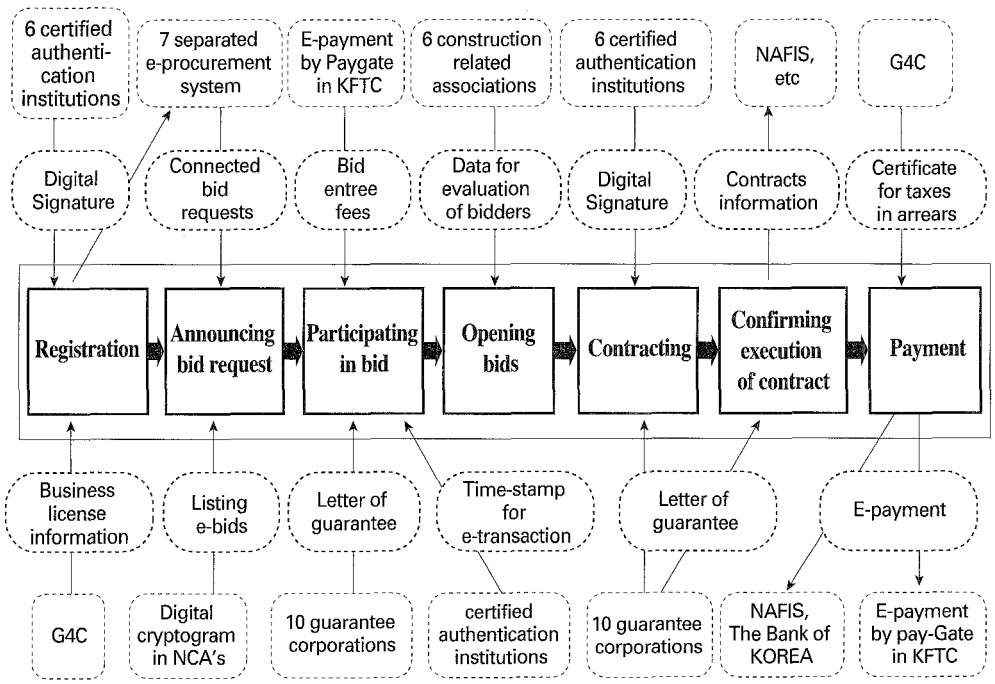
Year	Domestic Materials	Foreign Materials	Construction Works	Outsourcing	Foreign	Others	Total
2000	8,280	2,165	26,503	-	18	-	36,966
2001	15,146	2,040	54,141	-	28	-	71,355
2002	26,682	5,487	64,426	16,247	38	9,243	122,123
2003	48,815	5,876	71,660	22,170	45	-	148,566
2004	66,869	6,623	76,972	27,566	47	-	178,077

The introduction of the GePS transformed the traditional structure of the public procurement system into a network structure. There are three levels of networking in the KPS: the interagency network, the public-private GePS network, and the supplier-demander network

- **Interagency network:** The GePS is a networked system constructed with 53 external systems.
- **Public-private network:** In order to establish a customized service system, the KPS reinforced public-private partnership in the procurement policy-making process, as well as the implementing process. For example, the KPS has gradually enlarged private-sector participation by launching various public-private commissions for important decision making.
- **Public agency-company network:** Among the 37,000 public organizations and 150,000 companies involved in the GePS, networking is strengthened by the establishment of e-business.

The rapid development of IT has resulted in a dramatic decrease in the cost of communication and coordination. IT now enables transactions and communications across geographically dispersed areas with great speed, as well as flexibility. Nobody —except those committed to the corruption of the old system—is a loser in the transparent network system. This is a win-win game. The workflow of e-bidding is shown in Figure 3.

Figure 3. Workflow of E-Bidding and Links with Other Systems



CONCLUDING REMARKS: CUSTOMER SURVEY

The key people in the KPS—especially those working in the Division of Information Planning—are important. They provide strategic and tactical direction and the commitment to implementation that converts visions of new systems into improved organizational processes. Thus, it is an imperative for IT personnel at all levels to develop strong, ongoing partnerships with the key line managers in the organization. Only through these relationships can the necessary communication be engendered to ensure that both business and technology capabilities are integrated into effective solutions. As a leading agency in government innovation in Korea, the KPS has conducted

surveys of customer satisfaction. The results show that the GePS is a success story. Table 7 shows the degree of customer satisfaction with the speed and ease of use of the GePS.[2]

Table 7. Customer Survey Results (percent)

	Year	Merchandise		Construction Works		Difference of Opinion (negative)	
		Positive	Negative	Positive	Negative	Merchandize	Construction
Speed of service delivery	2000	69.2	30.8	85.1	14.9	-19.3	-9.8
	2002	88.5	11.5	94.9	5.1		
Easiness	2000	86.5	13.5	87.8	12.2	-3.4	-7.1
	2002	89.9	10.1	94.9	5.1		

Providing more innovative and higher-quality services is not enough in the field of procurement. Because there have been so many scandals across the world, most governments are focusing their efforts on fighting corruption in this field. Therefore, enhancing transparency is the most important concern. The GePS provides information in real time to anyone. This promotes fair competition and reduces direct contact between business people and public officials, thereby significantly reducing the possibility of corruption. Nobody can doubt the bidding results obtained by the GePS. The survey of companies that had participated in the bidding process shows that 82.8% of them was satisfied.[3]

Table 8. Customer Satisfaction about Transparency of Bidding (percent)-

	2003	2004	2005
Companies related to merchandise	70.2	78.6	77.6
Companies related to construction works	76.1	80.6	82.8

2. The survey was conducted by the KPS. Respondents were asked to choose their answer on a four-point scale ranging from "strongly agree" to "strongly disagree." The percentages in the table were calculated by adding the responses "agree" and "disagree."
3. The survey was conducted by the KPS. Respondents were asked to choose their answer on a five-point scale ranging from "strongly agree" to "strongly disagree." The percentages in the table were calculated by adding the responses "agree" and "disagree" after excluding "not decided."

REFERENCES

Cash, J. I., Eccles, R. G., Nohria, N., & Nolan, R. L. (1994). *Building the information-age organization: Structure, control, and information technologies* (3rd ed.). Burr Ridge, IL: Irwin.

Davenport, T. H. (1993). *Process innovation: Reengineering work through information technology*. Boston: Harvard Business School Press.

Earl, M. J. (1996). Limits to IT outsourcing. *Sloan Management Review*, 37(3), 26-32.

Earl, M. J., & Feeny, D. F. (1994). Is your CIO adding value? *Sloan Management Review*, 35(3), 11-20.

Handy, C. (1989). *The age of unreason*. Boston: Harvard Business School Press.

Harrington, H. J. (1991). *Business process improvement: The breakthrough strategy for total quality, productivity, and competitiveness*. New York: McGraw-Hill.

Henderson, J. C. (1990). Plugging into strategic partnerships: The critical IS connection. *Sloan Management Review*, 31(3), 7-18.

Hodgkinson, S. L. (1996). The role of the corporate IT function in the federal IT organization. In M. J. Earl (Ed.), *Information management: The organizational dimension*. New York: Oxford University Press.

Leavitt, H. (1965). Applied organizational change in industry. In J. G. March (Ed.), *Handbook of organizations* (pp. 1144-1170). Chicago: Rand McNally.

Leavitt, H. J., & Whisler, T. L. (1958). Management in the 1980's. *Harvard Business Review*.

Lucas, H. C., & Baroudi, J. (1994). The role of information technology in organization design. *Journal of Management Information Systems*, 10(4), 9-23.

Organisation for Economic Co-operation and Development (OECD). (1999). Impact of the emerging information society on the policy development process and democratic quality. Retrieved November 11, 2006, from http://www.olis.oecd.org/olis/1998doc.nsf/LinkTo/PUMA(98)15.

Powell, T. C., & Dent-Micallef, A. (1997). Information technology as competitive advantage: The role of human, business, and technology resources. *Strategic Management Journal*, 18(5), 375-405.

Rockart, J. F., Earl, M. J., & Ross, J. W. (1996). *The new IT organization: Eight imperatives*. Working Paper No. 292, Center for Information Systems Research.

Rockart, J. F., & Scott Morton, M. S. (1984). Implications of changes in information technology for corporate strategy. *Interfaces*, 14(1), 84-95.

Shao, Y.P., Liao, S. (1996) A New Organizational Model: Implications on virtual Organizations, *Dept. of Information Systems, City University of Hong Kong, Research Working Paper*, 96(03).

Seong, S. K., & Lee, J. Y. (2003). Developing e-procurement systems: A case study on the Government e-Procurement System in Korea. *Public Finance and Management*, 4(2), 8-9.

Hee Joon song. (2004) Building e-government through reform Governance Research Series 2, Ewha Womans University Press.

http://www.sourceoecd.org/9264013997.

NOTES

1. Davenport (1993, 51) predicts the potential impact of IT on business process reengineering. He describes the strengths of IT as follows:
   - Automational: eliminating human labor from a process
   - Informational: capturing process information for the purpose of understanding
   - Sequential: changing process sequence, or enabling parallelism.
   - Tracking: closely monitoring process status and objects.
   - Analytical: improving analysis of information and decision making
   - Geographic: coordinating process across distances.
   - Integrative: coordination between tasks and processes
   - Intellectual: capturing and distributing intellectual assets.
   - Disintermediating: eliminating intermediaries from a process.
2. The KPS transformed its organizational structure from the traditional direction-division style to "team" style, in accordance with the government-wide reform trend in 2005. This reform seems not to have brought the intended effect such as suppressing hierarchical culture.
3. See Seong and Lee (2003).