A STUDY ON ELECTRONIC PROCUREMENT

By

Hak-Yong Kim

THESIS

Submitted to

School of Public Policy and Management, KDI

in partial fulfillment of the requirements

for the degree of

MASTER OF BUSINESS ADMINISTRATION

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ABSTRACT

The tremendous growth of the Internet has led a critical mass of suppliers and customers to participate in the global online marketplace. The rapid adoption of the Internet as a procurement tool has caused firms to experiment with innovative ways of purchasing in computer-mediated environment.

The Internet and the World Wide Web are changing the inefficient, complex, costly purchasing processes and improving them in terms of quality, flexibility, and lead-time. The market for systems and services to support business-to-business relationships is one of the hottest areas of growth in Internet-commerce today.

This paper addresses the main issues and the values firms can derive from using electronic procurement. First, the paper proposes a framework for examining electronic procurement including the role of the government and industry. The paper then examines the main factors that have led to the implementation of electronic procurement, evaluating the benefits it provides to both suppliers and customers. The paper illustrates these through examples of successful early adopters from business to business electronic commerce including the case of POSCO. The paper finally reviews some of the current issues in electronic procurement systems and suggests recommendations for purchasing professionals in pursuit of electronic procurement development.

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Chapter 1. INTRODUCTION

1.1 Background and Objective

The Internet provides access to an on-line global marketplace which operates on a 24 hour basis, with millions of customers and thousands of products and services. It also provides companies with more cost effective and time-efficient means for working with customers, suppliers and development partners. Internet based electronic commerce will enable companies to shorten procurement cycles by ordering and paying through use of on-line catalogues; cut costs on both stock and manufactured parts through competitive bidding; reduce development cycles and accelerate time-to-market through collaborative engineering and product implementation; gain access to world-wide markets at a fraction of traditional costs; ensure product, marketing information and prices are always up to date.[1]

Increased global competition and pricing pressures are forcing companies to continually identify new opportunities for enhancing productivity and reducing costs. As a result, many companies begin to focus their attention on improving supply chain management activities, particularly corporate procurement processes.

Figure 1 illustrates the activities that a traditional firm performs to produce and sell a product or service.

Figure 1. The Value Chain

Inbound Logistics	Production Processes	Outbound Logistics	Marketing	Sales
Procurement				
Human Resource Management				
Technology Development				
Firm Infrastructure				

Source: M. Porter, Competitive Advantage, 1985.

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[1] Kosiur, David, "Understanding Electronic Commerce"., Microsoft Press, 1997, p 20.

Procurement is a process with many components that can influence the result. And it is clear that since procurement is responsible for controlling a dominant share of the company's revenue, it directly impacts profitability and the success of the overall business enterprise.

This paper aims to provide a comprehensive overview of electronic procurement with case studies related to electronic commerce and the Internet. Thus, the main purpose of this thesis is to gain an in-depth understanding of electronic procurement and to examine what the Korean government and leading companies can do with the Internet to get competitive advantage in the twenty first century.

1.2 Scope and Methodology

This paper focuses on business to business transaction especially from the buyers' perspective. In order to analyze electronic procurement, several types of opportunities are examined including their impacts and processes. In addition, three cases are illustrated to verify the fact that electronic procurement creates competitive advantage in the global marketplace.

The thesis is divided into four parts. First, this paper focuses on electronic procurement as the weapons of strategic purchasing. Therefore, an overall explanation of using the internet as procurement tool is provided including various issues, which will give an overall understanding what electronic procurement is. Second, the main issues of electronic procurement such as electronic sourcing, electronic catalogs, blanket orders, purchasing agent, logistics & supply chains are examined to implement electronic procurement, evaluating the benefits it provides to both suppliers and customers. Third, three case studies are illustrated; business to business transactions are examined including the case of POSCO. Finally, some of the current issues in dealing with electronic procurement systems are reviewed.

Chapter 2. LITERATURE REVIEW ON E-PROCUREMENT

2.1 Electronic Procurement and the Internet

Electronic procurement, in this paper, means the use of electronic commerce processes for procurement activities. It enables organizations to conduct their business activities using concepts, methods and cultures that are fundamentally different from those they have been accustomed to. The emergence of the Internet and intranets has revolutionized access to and use of information and communications.

Electronic procurement introduces exciting new ways for organizations to communicate internally and externally, do business deals, and manage supply chains and alliances. The business outcomes from these applications of information technology provide stronger relationships, enhanced business opportunities, and new forms of service delivery.[2]

The Changing Marketplace

International projections on the volume of businesses conducted on the Internet have reached hundreds of billions of dollars. Electronic procurement is widely accepted as the business purchasing model for the future.

Table 1 shows the transaction volume of electronic commerce in Korea.

Table 1. Volume and Forecast of Electronic Commerce

	Volume of Electronic Commerce Transactions		
	1996	1999	2002
Volume	1.4 billion won	150 billion won	3,780 billion won

Source: Ministry of Commerce, Industry and Energy (1999.2)

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[2] Kim, Chul-Whan, Kim, Kyu-Soo, "Electronic Commerce, Moonone"., 1999, p 73.

There were 150 billion won electronic transactions in Korea in 1999, and on-line purchasing has dramatically increased more than 107 times over the last 3 years. It is estimated that business-to-business electronic commerce transactions will increase more than 10 times in the near future.

Electronic procurement allows businesses to remove inefficiencies from their business processes. For instance, supply chains can be managed more efficiently, making it possible for businesses to work much more closely with their clients. Some enterprises have been able to re-engineer their supply chain radically and they no longer need to hold inventory. They can ensure their clients receive goods tailored exactly to their needs, just in time, directly. Such an operation can mean a significant cost saving for every member of the supply chain.

Through the use of networked applications, businesses can not only connect with their clients, service providers, employees and partners, but also create partnerships where all parties become more productive. All members of the supply chain are able to make more effective decisions through an understanding of purchasing patterns and consumption over time. Enterprises can now establish a presence, and gain access to global or national clients, in areas where they do not have a physical infrastructure.

According to recent data published by the Korean government, the penetration of computer was 15% in 1995 and 25% in 1999, and 8.5% of GDP in 1995 and 21% in 1999 were generated in the IT (Information Technology) industry. However, the volume of electronic commerce in Korea reached only 1.2% of the world total in 1999 and will reach 1.3% in 2000. Yet, taking the first step only needs the determination to try it and basic computer skills. This first step will enable businesses to access information from public and private sector clients, including electronic tender information, and make contact with government agencies or other service providers from any place at any time. The entry cost of electronic commerce can be low - a personal computer with a modem and access to the

Internet, a web browser and off-the-shelf software is enough to get started. Such a low cost of set-up may help businesses gain familiarity, develop skills, and appreciate the implications before investing further.

When it comes to more complex systems, experience has shown that the cost of the hardware and software is by far the smaller component. Adapting a system to the needs of a business, training people, and allowing for lost production during the changeover might make up as much as 90% of all cost, that is, more advanced processes will require more sophisticated technology, skill levels and investment.[3]

In case of Business to Business (B2B) in steel industry, the following Table 2 and 3 show the volume of transaction compared to that of steel consumption and the new entrants respectively.

Table 2. Emergence of Electronic Commerce Companies in the Steel Industry

Year/Month	' 98. 8	' 99. 9	' 99.10	' 99.11	' 00. 1	' 00. 4
Name	Metalsite (USA)	e-Steel (USA)	Steelscreen (Sweden)	iSteelasia (Hongkong)	Metalauctions (Germany)	Asiasteel Livesteel (Hongkong) Smartonline (Japan)

Source: POSRI (2000. 5)

[3] Kosiur, David, "Understanding Electronic Commerce"., Microsoft Press, 1997, p 23-34.

Table 3. B2B Transactions in the Steel Industry

				(Unit: Million Ton)
	2000	**2003**	**2005**	**2010**
■ *Steel Consumption*	680.2	741.5	759.3	873.2
□ *B2B Transaction*	5.2	62.3	131.7	399.9
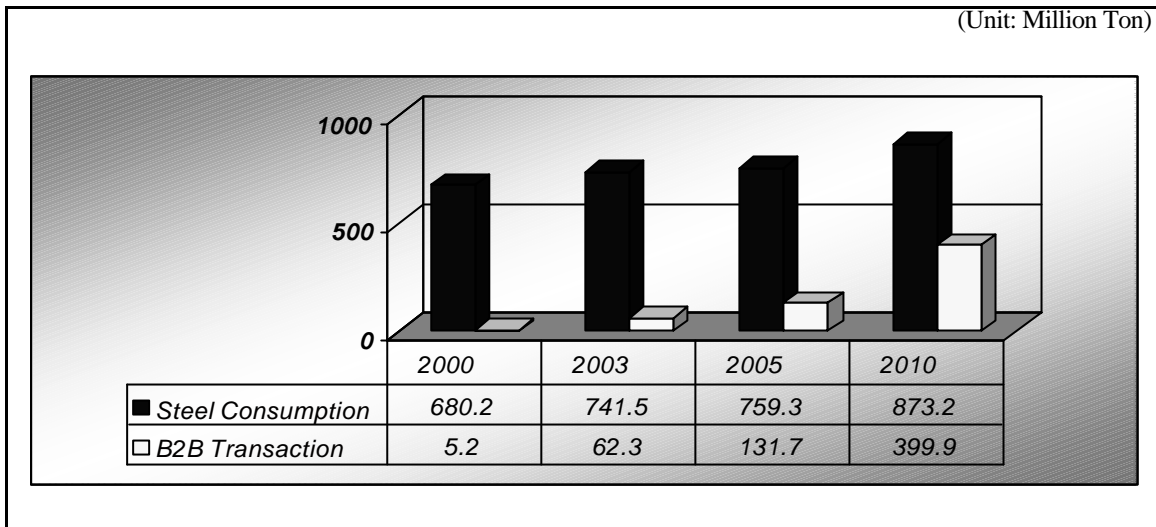
Source: World Steel Dynamics (2000. 4)

The Electronic Commerce Environment

Lack of familiarity and well-established practices tend to characterize the electronic commerce environment. It is difficult to assess risks or the levels of trust between the various parties. The extent to which governments could or should attempt to regulate for levels of trust has sparked lively debate. Electronic trading partners, particularly through the Internet, have to deal with issues of confidentiality, integrity, authenticity, the availability of their services, and intellectual capital. The electronic environment will lead businesses with well-established commercial relationships to become more dependent on their trading partners' management of the security of their information.[4]

Mechanisms for securing information must be appropriate to the risks, with the level of security appropriate to the value of the information being protected. A range of security mechanisms are available, from the very powerful to less powerful ones. Popular concerns are often misplaced in the electronic environment. For example, there is no reliable report of

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[4] Victor H., Pooler & David J., Pooler, "Purchasing and Supply Management"., Chapman & Hall Press, 1997, p 18-37.

credit card details being stolen while traversing the Internet, though thefts have occurred from inadequately-protected computer systems. This is analogous to the physical world, where confidential documents are seldom stolen from the postal or courier system. They are most likely photocopied from an unattended desk or filing cabinet, or credit card details stolen by corrupt employees of a merchant.

Digital information opens new avenues for fraudulent or illicitly-modified documents, making integrity and authenticity an area for concern. However, electronic commerce provides significant opportunities for heightened probity in the procurement process, through the legislative framework, better communication, greater 'spheres of influence' and better controls provided by embracing new technology. The growth of electronic commerce has overtaken the legislative framework, although some enterprises have traded electronically for some two decades with few problems.

Nevertheless there is a large body of legislation that assumes the environment of 'pen and paper' as referred to by 'writing', 'signing', 'original' and so forth, and this leads to some uncertainty in the electronic environment.

Some electronic transactions are time-critical, such as tender closing times. In the electronic environment, computer clocks can be adjusted to benefit a particular party. 'Place' is also a flexible concept when an enterprise has its systems operated by a service provider on another continent. While the time issue can be resolved by the trusted-third-party time-stamping services now becoming available, the requirement for something electronic to be in a particular place needs to be reconsidered.

The validity of contract documents in electronic form is governed by the terms of the contract, and contract law precedents, rather than legislation. However, in the event of a contractual dispute involving electronic evidence, there are few precedents to guide the

courts in determining the trustworthiness of documents submitted as evidence.

While technologists will attest to the trustworthiness of security mechanisms such as digital signatures, the legal issues associated with them have yet to be fully explored in court. Security is multi-faceted, and different tools and mechanisms deal with the different facets. Firewalls provide protection against attacks on information technology systems from outside an organization.

However, effective security management is needed to ensure that there are no other electronic paths into an organization, as well as addressing the myriad issues comprehensively outlined in the Information Security Principles of the Organization for Economic Cooperation and Development (OECD).

In an electronic procurement environment, the issues of integrity, authenticity and non-repudiation will usually be more important than confidentiality:

■ Integrity of electronic documents can be ensured by public-key certificates and digital signatures based on encryption technology.

■ Confidentiality of electronic messages transmitted through public networks can be ensured by a different type of encryption.

■ Authenticity can be ensured by certificates and signatures, but it also demands infrastructure that satisfactorily establishes the identity of digital signatories.

■ Non-repudiation ensures that parties either sending or receiving electronic messages cannot deny having sent or received the message.

The take-up of electronic procurement will be assisted if enterprises need only invest in a single system for the security of electronic transfer of information, rather than have to invest in multiple systems or be restricted in their market access.

Information security is a concern for all governments, and the Korean government has

adopted guidelines for security, including authentication and confidentiality. Applying these guidelines, within a risk management framework, will help suppliers to electronically transact business with governments in a mutually trustworthy manner. However, all governments also recognize that there is a need for both public and private sectors to address issues of wider information security in the networked electronic environment.

As mentioned before, the basic requirements for conducting electronic commerce include confidentiality, integrity, authentication, authorization, assurance, and privacy. Table 4 lists some of these threats along with security solutions.

Table 4. Some Security Threats and Solutions

Threat	Security Solution	Function	Technology
Data intercepted, read or modified illicitly	Encryption	Encodes data to prevent tampering	Symmetric encryption Asymmetric encryption
Users misrepresent their identity to commit fraud	Authentication	Verifies the identities Of both sender and Receiver	Digital signatures
Unauthorized user on one network gains access to another	Firewall	Filters and prevents certain traffic from entering the network or server	Firewalls; virtual private nets

Source: David Kosiur, EC Microsoft Press, 1997, p 66

In addition, intellectual property issues are perceived to be of significance where electronic commerce is involved, because of the ease of reusing information. In reality, the same rules apply to all illegal information, whether it is available in electronic form or hard copy. Electronic record-keeping offers comprehensive systems that are more secure and easier to access than conventional paper-based methods.

2.2 The Role of Government and Industry

Government Agencies

Korean government agencies are also taking up electronic commerce to various degrees. This paper explains the role of each agency and the importance for improvement of coordination and the exchange of initiatives and ideas between agencies. In this way, the full potential of electronic procurement to assist in the re-engineering of business processes will be realized.

Some examples of the work being done by agencies are:

- National Intelligence Service
  - Installing security and encryption
- Ministry of Finance & Economy
  - Improving the current system of electronic payment
  - Improving procurement related laws and regulations
  - Supporting electronic commerce
- Ministry of Foreign Affairs & Trade
  - International cooperation for electronic commerce
- Ministry of Justice
  - Improving electronic commerce related laws
- Ministry of National Defense
  - Establishing CALS (Computer-Aided Acquisition and Support)
  - Establishing electronic commerce of national defense
  - Enforcing EDI (Electronic Data Interchange) for procurement process
- Ministry of Education
  - Cultivating the experts of electronic commerce
- Ministry of Culture & Tourism

- Protecting the intellectual property

- **Ministry of Commerce, Industry & Energy**
  - Deliberating on the policy of electronic commerce
  - Proliferating electronic commerce for the industrial organization
  - Promoting cyber trade
  - Improving electronic commerce related laws, regulations, and policy
  - Developing technology and standardization of electronic commerce
  - Cultivating the experts of electronic commerce
  - Promoting information sharing among enterprises
  - Supporting logistics for electronic commerce

- **Ministry of Information & Communication**
  - Enforcing public authentication of electronic signature
  - Establishing protective guidance for individual information
  - Establishing super-high speed information network
  - Developing technology and standardization of electronic commerce
  - Cultivating the experts of electronic commerce
  - Supporting electronic commerce for public sector such as government procurement, CALS of national defense & construction, and procurement of public enterprises

- **Ministry of Health & Welfare**
  - Proliferating EDI for medical insurance

- **Ministry of Labor**
  - Supporting private training center
  - Enforcing a qualifying examination for electronic commerce

- **Ministry of Construction & Transportation**
  - Building CALS/EC for construction

- Supporting logistics for electronic commerce

■ Supply Administration

- Promoting electronic procurement

- Improving relevant laws and regulations related to the government procurement

■ Small & Medium Business Administration

- Supporting cyber trade of SMEs (Small and Medium Enterprises) such as making homepage and electronic catalog

■ Industrial Property Office

- Improving laws and regulations related to the intellectual property

■ Ministry of Planning & Budget

- Investigating current level of electronic procurement in public enterprises

- Enhancing the ratio of electronic procurement in public enterprises

- Supporting budget for electronic commerce

■ Fair Trade Commission

- Establishing general provision for electronic financial transaction

- Establishing standard stipulation for electronic commerce

- Protecting consumers of electronic commerce

Industry

Key industry stakeholders have identified the importance of the take-up of electronic procurement at all levels of industry. They see the need for:

■ the establishment of an electronic commerce business environment which instills confidence so that enterprises will move forward national consistency in the way individual jurisdictions resolve electronic commerce regulatory issues

■ industry and government encouragement to enterprises, particularly small-to-medium

enterprises.

Industry groups are setting the scene for the take-up of electronic procurement by developing policies such as strategic alliances between them.

A recent survey has found that there is a strongly-held view that electronic commerce will significantly impact the future of Korean business and the economy. However, the majority of companies have developed a 'wait and see' attitude. Others are 'dipping their toe in the water' to experiment in a limited way, such as the development of company web sites, rather than committing to significant investment. However, there are several enterprises that are enthusiastic early adopters of electronic procurement, and are setting an example of what can be achieved.

The Challenges for Government and Industry

Government and industry have faced several challenges when setting up the environment for developing electronic procurement.

1) Challenges for Government

In order to overcome the challenges, Government should:

- Provide leadership by being an early adopter of electronic procurement in its business dealings with industry.

- Establish a consistent and stable electronic procurement environment by ensuring that legislative and regulatory mechanisms facilitate electronic procurement, and by co-ordinating a consistent approach across different jurisdictions.

- Provide encouragement by creating awareness of the benefits, and where to find assistance.

2) Challenges for Industry

In order to overcome the challenges, Industry should:

- Adopt a strategic view. To take full advantage of electronic commerce and electronic procurement, organizations must be prepared to do business differently. They must also focus on returns in the medium-to-long term rather than the short term.

- Adopt a co-operative approach to business. Electronic procurement will require closer integration of business processes between trading organizations. This will require much more information sharing, trust and cooperation in various ways.

- Be willing to actively embrace change. Technology and new approaches to business should be seen as opportunities rather than threats to business.

2.3 Buyer-Side EC Legal Issues

As one begins to incorporate technology into everyday communication with suppliers, it is crucial to do so in a manner that protects the interests of your organizations. Most such existing safeguards are based on how business is conducted in a more traditional and paper-based environment. However, do not assume that one knows how traditional contract law principles will be applied if a dispute arises.

The UCC (Uniform Commercial Code) is currently being developed and will ultimately define a framework for national electronic commerce. Meanwhile, in lieu of laws specifically written with electronic commerce in mind, applicable laws include the UCC, state commercial codes, and - perhaps, more importantly - court interpretations.

Checklist of Contract Issues

There are three basic issues to be considered when forming electronic contracts:

- Contract Formation - This is essentially defined what constitutes a "writing". Traditionally, a "writing" referred to something that would be printed out in a documentary form.

- **Attribution** - Authenticity and non-repudiation are the related concerns here (i.e., What reasonable means will be used to attribute a document to a particular party?).

- **Enforcement** - This means determining under whose jurisdiction a contract will fall if it is enacted in "cyberspace."

Although the issue of a "writing" or "record" might appear to be fairly straightforward when referring to e-mail, issues of the integrity of the data being transmitted need to be considered. Given the fact that most e-mail is written in plain text and subject to interception by computer hackers, the privacy of information being so transmitted should also be of concern to both parties. Fortunately, modern encryption technology can address both integrity and privacy concerns.

Staying with the example of e-mail, encryption technology can also take care of authenticity and non-repudiation issues through the use of "digital signatures." Digital signatures tell the message recipient who actually originated the message or document and, through the use of a "message digest," also indicate that the message has been neither forged nor tampered with.

Some, but not all, jurisdictions have passed legislation that specifically recognizes digital signatures as legally binding. This doesn't mean that digital signatures would not necessarily be found legally binding in other jurisdictions. It simply means that legislation and/or court rulings have not yet been made.

Although it may be easy to draw a parallel between e-mail and paper-based transactions, what about the use of software agents that might transact business without any explicit human intervention or decision-making on either end of the transaction? As mentioned in an later feature, electronic purchasing agents, there are several prototype software agents under development that will be capable of doing just that. Such use brings up a number of questions concerning issues of offer, acceptance, and notice. While a corresponding parallel may not be

so apparent, one does exist in the law of agency. Even though not an "agent" in the traditional sense, the actions of a software agent that is created by a party to act on its behalf can bind that party to a transaction. It would allow for the use of such software, or "intelligent agents", by defining three methods of attribution:

- Actual involvement of either the party or its electronic agent;

- Compliance with an agreed upon attribution procedure; and,

- Lack of reasonable care resulting in loss to the other party.

In the absence of comprehensive universal legislation governing electronic commerce, many researchers recommend that purchasers enter into an "electronic commerce agreement" with their suppliers to govern all such electronic transactions. Such an agreement would define the minimum requirements for a "writing" (ex.: quantity, signature, etc.), and generally supplement terms that might otherwise be absent from the electronic transactions.

As we look more and more to technology to improve business processes and allow us to concentrate on more strategic activities, it is important to proceed with caution. The legal system has some catching up to do with regard to electronic contracts.

Chapter 3. IMPLEMENTATION OF E-PROCUREMENT

Purchasing has undergone quite a transformation to become the strategic business function that we see emerging today. Although it is a conventional function, its strategic importance is just now being widely recognized in many industries. This may be due largely to the relative contribution that purchasing can make to a company's competitive position. Generally, those industries with a higher ratio of purchased goods and services to sales revenues have been the first to recognize the potential bottom line benefits.

According to Aberdeen Group, significant benefits from Internet procurement are provided with improving supply chain management activities, particularly corporate procurement processes as shown in Table 5.

Table 5. Benefits from Internet Procurement

	Traditional/Manual	Internet Procurement
Price of materials & services	-	5-10% reduction
Purchase & fulfillment cycles	7.3 days	2 days
Administration costs	U$ 107 per order requisition	U$ 30 order per requisition
Inventory	-	25-50% reduction

Source: Aberdeen Group (1999. 6)

Purchasing professionals must use every means at their disposal to help their companies compete in the global marketplace. Fortunately, information technology has given us tools that can make this easier by eliminating non-value added tasks and allowing to concentrate on activities that have bottom line impact.

Buyers often are challenged with having to handle a one-time purchase for a commodity with which they are not familiar. In the circumstance that time frequently is limited, how can

a buyer quickly determine the appropriateness of a supplier's asking price? The database at the Internet may offer one solution. The World Wide Web homepage makes the full text of information available for viewing or downloading through electronic access over the Internet. In addition to searching by commodity group, users can perform a full text search of the actual contract documents. The information provided not only offers a basis for cost comparison, but also can help the buyer's sourcing effort since supplier contact information also is available.

Table 6 compares the traditional way of doing things to the electronic procurement version.

Table 6. New and Old Ways of Purchasing an Item

Sales Cycle Step	Traditional Commerce (Multiple Media Employed)	Electronic Commerce (Single Medium Employed)
Acquire product information	Magazine, flyers, catalogs	Web pages
Check catalogs, prices	Catalogs	Online catalogs
Generate order	Printed form	e-mail, Web pages
Send order	Fax, mail	e-mail, EDI
Check inventory	Printed form, phone, fax	Online database, Web pages
Generate invoice	Printed form	Online database
Receive invoice	Mail	e-mail, EDI
Schedule payment	Printed form	EDI, online database
Send payment	Mail	EDI

Source: David Kosiur, EC Microsoft Press, 1997, p 9

In this chapter, the main issues of electronic procurement will be illustrated to evaluate the benefits it provides to both suppliers and customers; Electronic Sourcing, Electronic Catalog, Electronic Bidding, Blanket Orders, Purchasing Agent, Payment, etc.

In addition to the main issues of electronic procurement, logistics and supply chain as a weapon of e-procurement in any company will be discussed.

3.1 Electronic Sourcing

Electronic sourcing means much more than merely having a plan for performing sourcing activity. Electronic sourcing involves locating potential suppliers and then evaluating, developing and managing their capabilities in a manner consistent with the enterprise's plans for meeting customer expectations and needs. Through innovative use of the tools that the Internet and its associated technologies – in particular the World Wide Web-have provided, purchasing can increase its contribution to a company's competitive position.

Locating Potential Suppliers

There are volumes of supplier promotional literature and printed catalogs coming into purchasing departments on a daily basis -–sometimes seemingly endless stacks of them! Add to this sourcing directories, numerous trade journals, general business publications, and periodicals and it is easy to understand why purchasing's mailbox is so much larger than most of the others in the mailroom.

There is so much paper-based information to be controlled that some purchasing organizations employ librarians to organize and file it, keep it up-to-date, and assist the professional purchasing staff in finding the right materials when needed. Even armed with the proper literature, it can be a laborious process to search through it, identify potential suppliers, and initiate contacts via telephone.

Computerized directories on CD-ROM and in proprietary data bases made the search process easier, but it can still entail using several directories and then beginning the game of "telephone tag" once potential suppliers are identified. How many times a day do we hear the phrase "Your call is very important to me . . ." when attempting to reach someone on the phone?

The World Wide Web has made locating potential suppliers even easier. Buyers have a choice of several online directory services. Rather than using a dedicated sourcing directory, a buyer can also search for a specific product or supplier directly by using one of the popular Internet search engines such as Alta Vista, Excite, Infoseek, or suppliers' own page.

A word of caution concerning search engines: key word searches for generic items can sometimes return tens of thousands of "hits" -- almost as bad as not finding any information at all. You can also guess at the URL (Uniform Resource Locator or, simply, Internet address) for a specific supplier site. Once a potential supplier is located, e-mail can be used more effectively than a telephone for the initial contact. E-mail combines the best features of telephone communication with those of postal mail. Like a telephone call, message transmission is virtually instantaneous and, like postal mail, the sender can include as much detail as necessary to convey the necessary information. In turn, the recipient has the ability to review the message when it is convenient to do so and as much as necessary in order understand the message.

In this respect, e-mail is also similar to voice mail, but it is much more powerful. Spreadsheets, reports, and product specifications complete with technical drawings can be sent with the push of a button. Although most companies are still using their corporate Web sites as purely outbound marketing tools, this is sure to change as they learn of the wealth of benefits that it can bring to the management of their supply chain. The benefits run the gamut from improving the quality of inter-departmental and supplier communications, while reducing the amount of required staff effort, to improve purchasing's global sourcing efforts. A properly constructed Web presence can even function like an elaborate network of IPOs (International Purchasing Offices) -- at a mere fraction of the cost -- identifying potential suppliers in regions that could have been overlooked using more conventional sourcing methods. Think of a corporate purchasing Web site as an elaborate interactive supplier

greeting pamphlet. You can let potential suppliers know what you expect of them, as well as what they can expect of you.

You can detail the types of goods and services that purchasing procures and outline the process that potential suppliers should follow to contact purchasing. Even better, you can:

- provide an online form for potential suppliers to complete as part of a pre-qualification process;

- take the answers from the form and plug them into a spreadsheet for automatic analysis and derivation of information like financial ratios, profit margins, and financial performance projections;

- upload the supplier information and analysis into a potential supplier data base; and,

- index the data base to facilitate future searches for potential suppliers.

(Such a data base of pre-qualified potential suppliers can be an excellent strategic tool for purchasing to use in managing the risks that are associated with supplier base reductions and sole-sourcing practices.)

Evaluating Supplier Capability

Some supplier Web sites provide information such as ISO certification status and others may even make a version of their annual report available; however, few contain enough information on their own to enable buyers to make a proper supplier qualification decision. Certain financial information about prospective suppliers can be obtained from online sites such as Annual Reports Library, Dun and Bradstreet, Hoover's Online, KnowX, and others but, again, the usefulness of the information may be limited.

In order to make informed sourcing decisions, buyers may also need factual information about suppliers such as: quality control and quality assurance programs; process systems; organization; management; environmental commitment; required lead time; delivery

capabilities; product and service expertise; technical competence and stability; training and development programs; general industry reputation and status.

Although detailed information mentioned above is generally not available online, purchaser can still use Internet related technology to gather the required information from prospective suppliers by providing them with an electronic audit questionnaire form that, once completed and returned, can be used to begin the necessary analysis.

Supplier Development & Management

Superior communication is the key to maintain superior supplier performance. Internet related technologies such as intranets, web browsers, e-mail, PDF (Portable Document Format) writers and viewers, "white-board" and collaborative editing utilities, video conferencing programs, and a host of others have dramatically improved our ability to communicate and have, just as dramatically, reduced the costs of doing so. Let's look at some examples of how this technology can be utilized for tasks that are typically associated with supplier development and management.

Supplier education and training programs can be delivered through a combination of interactive Web-based technology features such as: video conferencing; online presentations; message threading for online discussion forums; and, form-based tests of understanding. All can reduce the costs of supplier training and the last three are particularly useful if differences in time zones would make "real time" educational programs problematic. In fact, online educational programming can even be structured so that a particular program can be started at any time and taken at the student's own pace.

Linkages between buyer and supplier engineering departments, using the communication technologies mentioned above, can provide supplier education and can also create synergies that will benefit the buyer's engineering department as well.

As summarized in Table 7, electronic commerce offers several opportunities to suppliers and commensurate benefits to customers.

Table 7. Opportunities and Benefits from Electronic Commerce

Supplier opportunity	Customer benefit
Global presence	Global choice
Improved competitiveness	Quality of service
Mass customization & customerization	Personalized products & services
Shorten or eradicate supply chains	Rapid response to needs
Substantial cost savings	Substantial price reduction
Novel business opportunities	New products & services

Early supplier involvement in product development has proven its value in various ways; cutting costs, improving quality, reducing cycle times and hastening time-to-market. Brother Industries, Sony and Toshiba provide good examples of innovative use of Internet related technologies. By allowing suppliers access to its intranet, they are able to work collaboratively with the designers and end-users of their products.

Supplier involvement in redesign and value analysis projects can also result in new ideas, lower costs, higher quality, reduced cycle time, and more customer-responsive products. EDI (Electronic Data Interchange), a more traditional way of electronically linking between buyers and sellers, can eliminate much of the administrative trivia and paperwork from the traditional buyer/seller relationship but it has proven to be extremely complex, costly, and difficult to implement and maintain. It basically involves five main processes:

■ extracting data from a system;

■ converting the data into a transmittable format;

■ transmitting the message;

- interpreting the message at the receiving end; and,

- downloading the data into the receiving system.

Setting up the necessary software at each end is just a part of administering the system. EDI generally relies on a third party, known as a VAN (Value-Added Network), to transmit the message. This VANs tend to add more complexity and incur cost to the EDI process. However, recent improvements in security technology allow EDI to be carried out over the Internet and linkage between buyer and supplier intranets.[5]

Table 8 compares the services offered by Internet access providers and VANs for handling EDI.

Table 8. EDI on a VAN vs. the Internet

Feature	Internet Access Provider	Value-Added Network
Store & forward mailboxes	Yes	Yes
Secure environment	No	Yes
Reliable performance	No	Yes
Service provider accountability	Limited	Yes
Customer support	Limited	Yes
Interactive access	Yes	Extra cost
Electronic info access	Yes	Limited, may cost extra
Content hosting services	Costs extra	Costs extra

Source: David Kosiur, EC Microsoft Press, 1997, p 59

Even though EDI offers many benefits, it is not for everyone. Due to its complexities, there are probably at least as many failures as there are success stories. It is best suited for

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[5] Pete Loshin, "Electronic Commerce" SungAn Press, 1997, p12-24

high volume JIT (Just-In Time) type production environments where a replenishment order can be automatically generated and transmitted to the supplier when called for by demand forecasts and where the benefits of increased velocity and reduced administrative overhead outweigh its costs.

Link Sourcing to Corporate Strategic Plans

In our definition of strategic sourcing, the process must be managed "in a manner consistent with the enterprise's plans for meeting customer expectations and needs." Although the planning process, and the resulting strategic plan and implementation steps, can vary from company to company, there are elements that most plans will have in common. Many researchers identified the following as the most critical competitive capabilities for a firm:

- Low product prices as a result of being a low-cost producer

- Highest perceived product quality

- Ability to bring new products from concept-to-customer in the shortest time in the industry

- Product features that offer the highest performance

- Product support and best customer service with short lead times.

A review of these capabilities may reveal the value of supplier contributions, and the importance of purchasing's performance in managing the supply base, to an enterprise's competitive success. Rather than measuring purchasing's performance based upon outdated metrics such as cost-per-PO (Purchase Order), enlightened organizations are developing staff performance plans based in large part upon what the department needs to accomplish in

order to support the overall organization. These individual staff performance plans then form the foundation upon which departmental and ultimately organizational success is measured.

As we have shown, purchasing can use the Internet's emerging information technology tools to maximize the value of supplier contributions by:

- Reducing operating, ownership, and procurement costs

- Controlling risks

- Decreasing complexities of inter- and intra-company communications

The Future Information technology has already enabled business to move forward at a much faster pace than ever before. To illustrate, just a few years ago, the best way to send detailed information such as a proposal package (consisting of the proposal itself, technical specifications, background and ancillary supplier information) was via an overnight delivery service. Depending on origin and destination, if the package had to travel internationally between continents it would take 2 or more days to arrive at a direct cost of approximately $100 for a typical 2 lb. package. Now the same amount of information can be encrypted with the recipient's public encryption key (to ensure data integrity and privacy in transit), digitally signed with the sender's private encryption key (to guarantee authenticity and non-repudiation), and sent via e-mail to arrive almost instantaneously at the direct cost of a local phone call.

Many forward thinking companies are actively developing strategic plans to integrate some form of Internet-based electronic commerce into their supply chain management practices to allow them to develop and/or maintain a competitive advantage. Such electronic commerce offers many benefits and may very well hold the key to future success in an increasingly global marketplace; however, it is not without formidable obstacles that must be

overcome before it gains wide-spread acceptance. Nevertheless, considerable progress is being made.

A number of companies, including Microsoft, IBM, Open Market, and CyberCash immediately announced their supports for the new protocols that identified the appropriate payment methodology to the supplier. At the same time, CommerceNet and the Electronic Frontier Foundation announced the establishment of eTrust, a licensing and accreditation system designed to ensure privacy for electronic commerce users. Built around a common set of business requirements and a supporting technical architecture, specifications, and guidelines, the recently released Open Buying on the Internet (OBI) standard represents a major step forward for business-to-business electronic commerce.

Information technology has been a key enabler in purchasing's evolution into a strategic business function by eliminating non-value added activities and allowing purchasing to focus its efforts on activities that have bottom line impact.

If purchasing is to remain as a strategic business function, it must remain ahead of the information technology curve-exploring and implement new technologies that promise to add to companies' competitive advantage.

3.2 Electronic Catalogs

In the beginning there were printed catalogs seemingly endless stacks of them. So many, in fact, that some organizations' purchasing departments employed administrative staff whose primary function was that of librarians - organizing the supplier catalogs and ensuring that the most current editions were available to the purchasing professionals.

In addition to costs, such systems have a major inherent weakness: they only work in a highly centralized environment in which purchasers' customers are in the same location and have easy access to the purchasing department. What about situations in which internal

customers are at other facilities or work different shifts? Under these, more prevalent, circumstances centralized catalog management is not practical and a decentralized approach is necessary.

Decentralized printed catalog management solves the accessibility issue, but creates problems of its own. The primary drawback is that of keeping only the most current editions available. Product availability, specifications, and price are all subject to change. Not having current information can result in ordering delays and the failure to meet customer expectations.

Despite the fact that it is in their best interests to do so, keeping catalogs current is seldom a customer priority. Although electronic catalogs solve the centralized/decentralized management dilemma by providing local access to centrally maintained information, they bring up the question of who should manage the catalogs: suppliers, professional buyers, or a third party. Most electronic catalog models take a "hub & spoke" approach and have both advantages and disadvantages.

There are many pros and cons in managing, and controlling electronic catalogs.

1) Supplier Managed Electronic Catalogs

■ Pros (Supplier's Perspective)

- Low cost

- Easy maintenance

- One system for all customers

- Fast and easy to use

■ Cons (Buyer's Perspective)

- One supplier's catalog may be accessed at a time

- Buyer must know which catalog to access

- Multiple systems must be learned

2) Buyer Managed Electronic Catalogs

- Pros (Buyer's Perspective)

  - Fast and easy product-centric search and selection

  - Access to multiple supplier offerings

  - Uniform system for all suppliers

- Cons (Supplier's Perspective)

  - Multiple catalog format support results in:

    - Duplicate effort

    - Complicated content management

    - Increased costs

3) The 3rd Party Managed Electronic Catalogs

- Pros (Both Buyer & Supplier Perspectives)

  - One system for all customers / suppliers

  - Suppliers control catalog maintenance

  - Fast and easy in use

- Cons (Both Buyer & Supplier Perspectives)

  - Increased costs

A departure from the more traditional "hub & spoke" is the trading partner web concept that is also comprising pros and cons

- Pros

  - One system for all customers / suppliers

  - Suppliers control catalog maintenance

- No catalog aggregation related costs

■ Cons

- Multiple unique catalogs can slow search process

- OBI (Open Buying on the Internet) standard is not widely supported by existing EC products or systems

The right model to choose depends very much on the environment and the needs of individual organizations. If an integrated supply relationship or a very high degree of supplier consolidation has taken place, then supplier managed electronic catalogs may be the answer.

If it is desirable to use multiple suppliers and the ROI (return on investment) from automation is judged to be high enough to justify the additional costs, either a buyer or a third party managed catalog could be the right solution. If, on the other hand, an organization could benefit from catalog automation but is not quite ready to take the plunge, it may be best to wait for OBI (Open Buying on the Internet) compliant products to be introduced into the market. Whatever your choice of methodology, electronic catalogs are a major step forward in the procurement of indirect materials.

3.3 Blanket Orders

Blanket orders, long considered one of the most effective cost reduction tools, enable self-service purchasing environments in which purchasing is free to manage the process, rather than process its transactions. As such they are an essential prerequisite for many electronic commerce systems such as electronic catalogs. It is in the blanket order that prices, terms, and conditions are set. In other words, this is where purchasing adds value and cost savings - both hard and soft - are achieved. Blanket orders are most effective way used to manage the procurement of repetitively used goods and services.

These orders are essentially an expression of an organization's intention to buy all or part of its requirements for a certain category of goods and/or services from a particular supplier during a given period of time. Blanket orders generally carry no guarantee that the buying organization will purchase a given volume during the term of the contract, but rather contain estimated volume or other "output requirements" language.

Blanket orders can offer important quantitative and qualitative benefits:

- Hard cost savings can be realized through improved purchasing leverage.

- Operational efficiencies, reductions in the administrative effort required to process an order, are generally considered "soft" cost savings; however, actual costs can be reduced if, for example, less overtime or temporary labor is required as a result.

- Lead times are generally reduced by end users contacting suppliers directly.

- Buyers are allowed to concentrate their efforts in value added activities by being relieved from processing routine orders.

Blanket orders are generally appropriate when an organization will:

- purchase repetitive, specified services or items, or categories of items from the same supplier;

- order standard materials or supplies which require numerous shipments; or,

- be able to effect cost reductions though supplier base reductions and increased buying leverage.

Blanket orders are generally not used when:

- no benefit is derived over and above a regular purchase order;

- prices are unknown at contract time, or are subject to change without notice;

- quality of the supplier or of the supplier's goods or services is questionable; or,

■ control over organizational expenditures would be weakened.

Although the appropriate methodology may vary somewhat by organization, the following steps should probably be included when contemplating establishment of a new blanket order agreement:

■ Review purchase history

■ Determine rationale for creating agreement (i.e. cost savings, etc.)

■ Obtain authority to contract

- Prepare purchasing strategy including information on major internal users, market availability, and price trends as applicable.

- Obtain approval of purchasing management to proceed.

- Distribute the plan to the major internal users' decision makers and obtain their approval for the plan.

■ Conduct usage study

- Obtain user's input.

- Develop and issue survey to users.

- Tabulate survey responses and prepare summary.

■ Prepare RFP (Request for Proposal)

- Obtain users' input.

- Agree on potential sources of supply.

- Develop specifications.

- Obtain legal review, as appropriate.

- Distribute to selected potential suppliers.

- Analyze resulting proposals, document results, develop post-tender negotiation strategy, etc.

- ☐ Obtain users' input.
- ☐ Recommend supplier.
- ■ Post-tender negotiation
- ■ Contract award
  - ● Obtain legal review, as appropriate.
  - ● Develop supplier contact methodology.
  - ● Established supplier performance metrics
  - ● Award contract
  - ● Prepare and disseminate internal users' guides (i.e., instructions on how to access the contract)
- ■ Administer agreement
  - ● Monitor user departments' usage.
  - ● Resolve pricing/delivery problems.
  - ● Evaluate supplier's performance through the use of established metrics and through feedback from the major users.

Back in the dark ages, before Intranets and electronic catalogs, internal users would be informed of how to access blanket orders through the use of a paper-based users' guide. Typically in the form of a three-ring binder, this guide would contain sets of instructions on how to order the goods and services covered by various blanket agreements.

Although such paper-based guides can effectively provide instructions to purchasers' internal customers, they do share a problem common to any such manual distributed information system: maintaining current information requires decentralized effort. Not only must purchasing distribute current information, but users must also update the manuals upon receipt of new guides.

A far better solution would be to publish such buyers' guides on the corporate Intranet. In this way, current information is maintained centrally and made available upon request to purchasers' internal customers. Once the blanket order is in place, purchasers' internal customers issue releases against the contract as goods and/or services are needed. In most cases, these releases will be issued directly to the approved supplier with record of the transaction being recorded through any one of a number of means. (Though some organizations may route this release through purchasing for control purposes, this somewhat defeats one of the primary advantages of blanket orders: getting purchasing out of the transaction processing business.)

Most automated systems, such as electronic catalogs, capture transactional data and either record it internally or pass the data through to a legacy system. Although most such systems can provide excellent control and record-keeping for a self-service purchasing environment, the absence of an automated system should not mean that purchasing has to remain in the transactional loop. Many suppliers can satisfy buyer-side documentation needs by providing the necessary information in the form of paper-based or electronic reports from their order entry and billing systems.

Blanket orders, whether used in conjunction with an automated procurement system or not, can contribute to an organization's competitiveness and enable purchaser to function at a strategic, rather than tactical, level.

They deserve a place in every purchasing professional's toolkit.

3.4 Purchasing Agent

Software, or intelligent, agents are electronic assistants that help computer users by performing routine tasks, typically in the background, while the user continues to work on other matters. Gathering, filtering, and presenting information are some of the small and

well-defined tasks given to the simpler agents. One example of a simple agent is the filter that many people use in conjunction with their e-mail program. There are several prototype software agents under development that will be capable of doing even more on behalf of buyers.

An ongoing research project at MIT (Massachusetts Institute of Technology) using multiple agents is intended to help bring about a fundamental change in the way of buying and selling is conducted - doing much of the work on the user's behalf. A buyer needing to procure particular goods would create an agent, give it basic strategic direction, and send it off into the electronic marketplace. The agents would then pro-actively seek out potential sellers and negotiate with them on the buyer's behalf, making the best possible deal, based on a set of constraints specified by the buyer, including a highest acceptable price and a transaction completion date.

Another prototype agent developed by Andersen Consulting can give an ides for how intelligent agents may affect online commerce. In their online demo, visitors had been invited to enter the name of the artist and album of the music CD into an HTML form. Once the form is submitted, the agent gets prices from ten online music retailers.

Even more sophisticated agents are under development that can learn by observation, make decisions, and filter incoming information, i.e., select new items based on preference, search databases looking for selected pieces of information, or conduct transactions, such as place orders. An example of such an adaptive agent, also developed by Andersen Consulting recommends Web pages that are based on user lifestyle input.

The use of such electronic agents brings up a number of legal questions concerning issues of offer, acceptance, and notice. How will such electronic agent use be viewed by the law? It is currently being developed and will ultimately define a framework for national electronic commerce, including the use of such electronic agents. While a corresponding

parallel may not be so apparent, one does exist in the law of agency. Although not an "agent" in the traditional sense, the actions of an intelligent agent that is created by a party to act on its behalf can bind that party to a transaction. it would allow for the use of such intelligent agents by defining three methods of attribution:

- Actual involvement of either the party or its electronic agent;

- Compliance with an agreed upon attribution procedure; and,

- Lack of reasonable care resulting in loss to the other party.

3.5 Logistics & Supply Chain

It is indeed absolutely astounding how fast change is now occurring in logistics and supply chain management. Logistics and supply chain management are rapidly becoming one of the most central of business issues as we enter the new millennium.

In this feature, we explore the major impact on rapidly growing Internet shopping and consumer direct business models will have shortly on traditional distribution methods and channels, and end with descriptions of two related future features outlining the other important reasons why keeping up to date on logistics and supply chain management is critical to the future health and success of your company. Traditional players ignore this threat at their peril and must rapidly begin to adjust their networks to support and defend against these challenges from online pioneers.

Any traditional firms who do not raise this challenge will sooner or later face significant negative business fallout and increase percent to sales expense ratios as this growth occurs. Much of the change we speak of is driven by the concept of disintermediation which basically represents the removal of all "middlemen" which add no real value between the process of manufacturing a product and its movement and ultimate sale to the end users. In the purest form, application of this concept challenges the need for a manufacturer to use

distributors and even retailers as channels to move their products to end consumers. In most cases, traditional distributors and retailers only add cost and their profit margins to the total "to end consumer" cost.

Companies who are current intermediaries that ignore this reality are not ensure that their involvement adds true value will be cut out of the consumer delivery channel by savvy manufacturers and/or ultimately the direct price market forces caused by consumers demanding the lowest total end consumer price.

Wal-Mart is one firm which has already identified this key challenge and are moving rapidly to provide true value add for the manufacturers who work with them to give consumers better ultimate value. In past interviews Wal-Mart CEO David Glass said that although their online business only represented a very small part of their current total revenues, they consider it to be a key part of Wal-Mart's future strategy. If you visit their website through the link above you will notice that it is now a prime time for business site which less than a few years or so ago wasn't much more than an outlet for clearance merchandise.

Chapter 4. CASE STUDIES OF E-PROCUREMENT

4.1 Case Study of Early Adopters

The structure of business to business electronic commerce can be sub-divided into three categories depending on who has the initiative in the market places; a supplier-oriented marketplace, a buyer-oriented marketplace, and an intermediary oriented marketplace as shown in Table 9.

In any given industry, it depends on who has the best mix of assets and industry expertise to build market liquidity.

Table 9. Structure of B2B EC

Type	Location of server	Role	Case
Supplier-oriented	Supplier	Buyers are searching for suppliers	Dell
Buyer-oriented	Buyer	Suppliers are searching for buyers	GE (TPN)
Intermediary-oriented	Intermediary	Buyers & suppliers are searching	Boeing

1) Supplier-Oriented Marketplace

The common structure of business to business electronic commerce is supplier-oriented marketplace including an electronic shop where most producers are dominant in the market.

As shown in Table 9, individual buyers and business buyers are searching for the same market provided by the suppliers.

■ Dell

Dell's marketing strategy can be a model for supplier-oriented marketplace. Dell gained a reputation by its mail-order sale and increased its net profit by 59% in 1997 compared to that of 1996, which reached to the amount of 12.3 billion dollars. The key success factors are at the root of the Internet based marketing. Dell provides the individual, the purchaser of

enterprises, and the suppliers of parts with hardware and software by means of the Internet. Upon receiving orders from buyers, the ordered commodities are produced through the process of Make to Order and finally delivered to the buyers.

A special performance of Dell lies in inventory management where Dell has an competitive advantage over the competitors through intranet and extranet. The management enabled Dell to shorten inventory carrying period from 80 days to only 7 days.

■ Supplier-Oriented Auction

Auction sites like Ingram Micro is another case of suppliers oriented marketplace. In case of Internet auction, the suppliers can settle surplus commodities while the buyers can purchase commodities at competitive price.

2) Buyer-Oriented Marketplace & Electronic Bidding

The giant enterprises such as GE should search and compare thousands of suppliers in the process of procuring numerous MRO goods on the Internet. As the cost of purchasing process is increasing, the big enterprises wish to create the electronic market with the Internet as an effective marketing strategy. This is called buyer-oriented market place in which the purchasers establish the electronic market on the Internet and the perspective suppliers are conducting electronic bidding through the RFQ (Request For Quotation) provided by the purchasers.
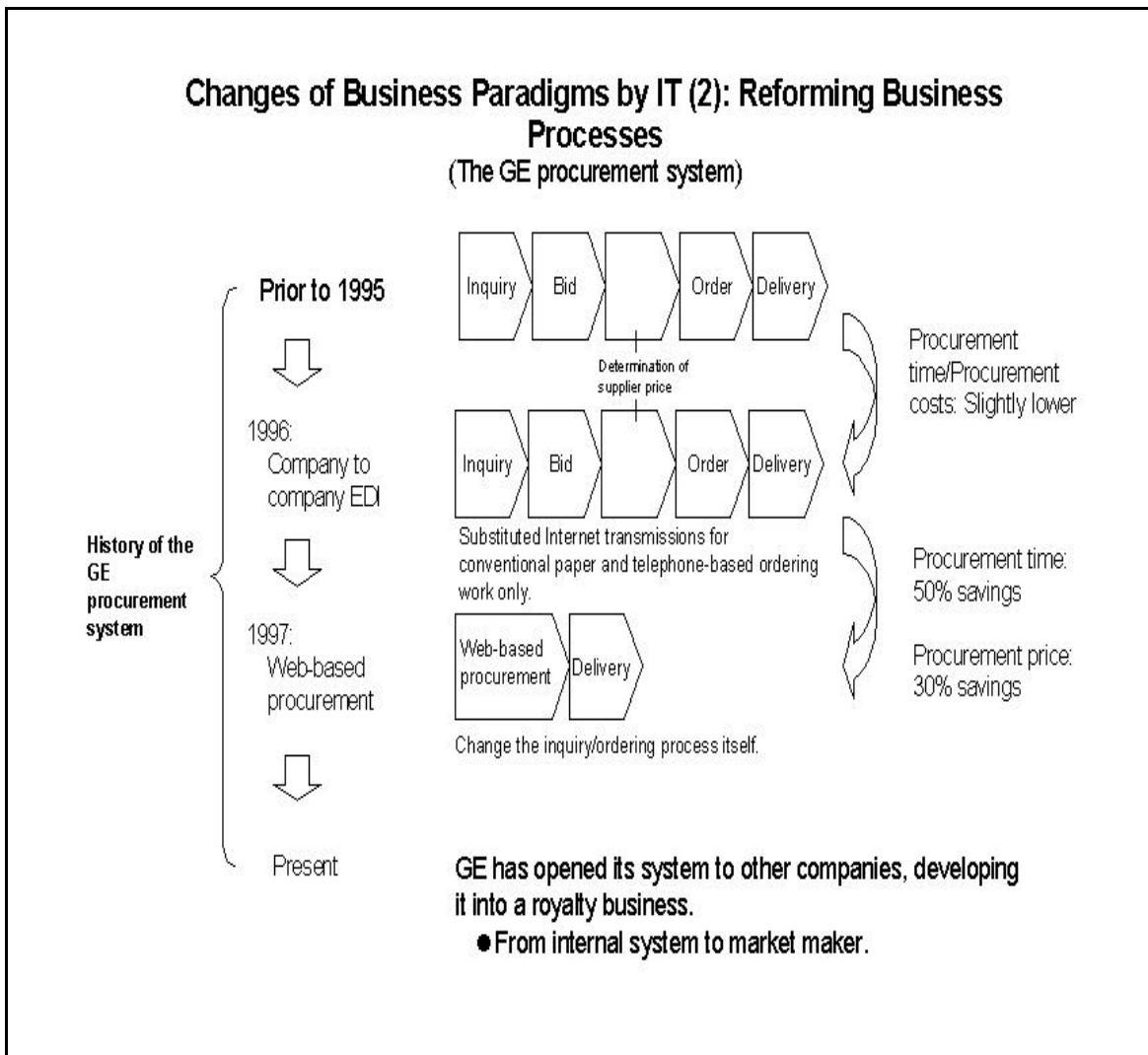
■ GE TPN Post

GE TPN (Trading Process Network) Post is a portfolio of easy-to-use, Web-based products and services designed to increase productivity and open doors to new business opportunities. GE TPN Post is a secure Internet solution to allow buyers and sellers to

conduct business electronically. To aid the purchasing process, GE TPN Post offers a robust solution combining software and services to help buyers locate new suppliers worldwide, streamline their purchasing processes and dramatically shorten cycle times.

GE TPN Post can also assist sellers in shortening sales processes and reducing sales costs by providing a comprehensive solution set. Sellers can improve their sales productivity with automated the sales and bidding processes.

Figure 2 shows the development processes of the GE procurement system

Figure 2. GE Procurement System

A typical example of this model is GE TPN Post known as the best practice of electronic bidding. The material costs of GE have increased 16% from 1982 to 1992 while the price of goods was stable and decreased for the same period. This forced GE to make a great effort on the procurement process. According to the analysis of the procurement process, GE's procurement process had no leverage effect given the scale of GE.

In addition, one fourth of 1.25 million's invoices was discrepant among purchase order, receipt, and invoice. After comprehensive review, GE came to a conclusion that purchasing the Internet was the only solution to improve the procurement process. The procurement division of GE Lighting sent hundreds of the RFQs to the suppliers a day where as it took 7 days to deliver before.

GE Lighting started on line purchasing called TPN Post (Trading Process Network) in order to get advantage of cost saving in procurement and supply chain management in 1996.

The procurement division receives purchasing requests from other divisions and then, registers them to the perspective suppliers through the Internet with bidding information, drawing and relevant data. This whole process is automatically conducted within two hours and the suppliers recognize the arrival of the RFQ in the form of E-mail, fax, or EDI, etc.

As soon as receiving the RFQs, the perspective suppliers participate in the electronic bidding through the extranet of GE Lighting within 7 days.

- Bidding procedure of GE TPN Post
  - □ Buyers prepare RFQ information
  - □ Buyers identify potential suppliers
  - □ Buyers post RFQ to the Internet
  - □ Buyers invite suppliers to bid on the project
  - □ Suppliers download RFQ information from the TPN
  - □ Suppliers submit bids for each item in the project

- Buyers evaluate the supplier bids and negotiate online to achieve the "best deal"
- Buyers accept the bid(s) that best meet their requirements

- Participants' benefits in GE TPN Post

GE TPN Post allows buyers and sellers to conduct business electronically via the Internet. The software for GE TPN Post buyers, buyers can streamline the supplier identification, RFQ preparation and distribution, negotiation and award process. The TPN Manager allows buyers to:

- Identify qualified suppliers worldwide
- Distribute RFQs and specifications to global suppliers
- Transmit electronic drawings to multiple suppliers simultaneously
- Hold multiple bidding rounds until a favorable price is reached
- Receive and manage bids and seller communications efficiently and cost effectively

And main benefits in GE TPN Post is:

- Increasing productivity in the purchasing arena for buyers
- Establishing a global reach in marketing for both buyers and sellers
- Decreasing costs and cycle times in sales efforts for suppliers.

3) Intermediary-Oriented Marketplace

Intermediary-oriented marketplace is similar to the marketing system of shopping mall. This is based on the similar model of business to consumer electronic commerce.

■ Boeing

Boeing applied the Internet technology in intermediary-oriented marketplace to communicate with airlines, and maintenance providers, etc. The Internet service of Boeing

consists of three parts; PART Page for parts procurement, Bold (Boeing On Line Data) for technical manual or draft, and PMA (Portable Maintenance Aid) for maintenance.

In case of Boeing, less than 10% of the buyers used EDI for large orders in 1993. But under the Internet environment, about 50% of Boeing's customers utilized EDI in 1996. Therefore, it led to a decrease in costs and cycle times in maintenance efforts for customers. One of the customers, US Airline, reduced its costs by one million dollars and Boeing also reduced telephone orders by 600 times as it increased 20% of parts delivery.

■ The third person's Electronic Bidding and Auction

The third person or outsider as an intermediary can provide service of bidding and auction. GE TPN Post provides its site for other purchasers as the intermediary marketplace of their own order request. In that case, GE TPN Post can be called as intermediary-oriented marketplace.
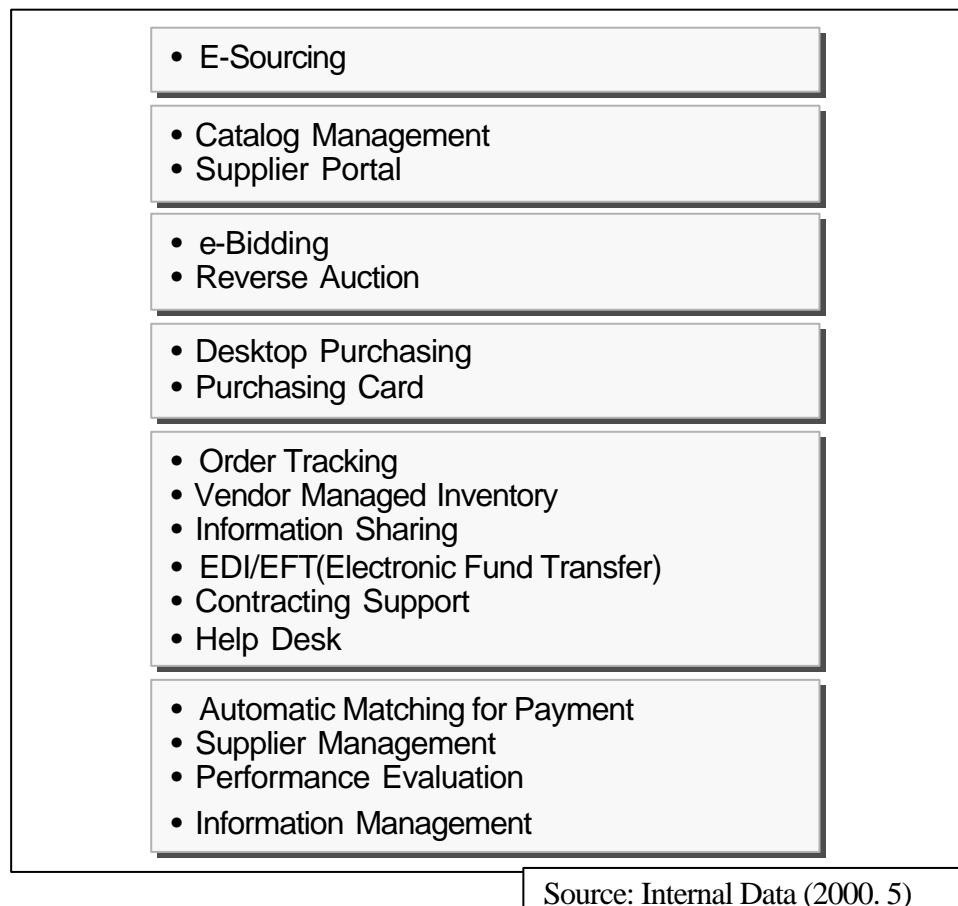

4.2 Case Study of POSCO's E-Procurement Initiative

POSCO, the biggest steel-making company in the world, has been providing information services to its customers by the name of Steel-VAN and EDI which have been in service since 1987 and 1997 respectively. Regarding the current level of electronic procurement, some of the bidding information is provided in the Internet. However, the scope and information about all the procurement process are relatively limited. In order to improve its current processes to be more competitive and customer oriented, POSCO launched a PI (Process Innovation) project in which over 5,000 employees participate in terms of the total man-days. One of the main goals of PI (Process Innovation) is to implement electronic procurement in association with strategic purchasing by reducing inventory and simplifying the process. POSCO is now trying to improve the current system of electronic procurement and unify it into ERP (Enterprise Resource Planning).

Electronic bidding, not conducted so far, will be adopted at the end of 2000. After completion of the project, the ratio of electronic procurement will increase from 65% to 95% for MRO goods. In addition, more than 50% of all materials will be covered by electronic bidding process. The current procurement system of POSCO is linked only with the restricted suppliers that are already registered and the content of information is largely limited. When the project is completed, all the purchasing process will be conducted in cyber space.

POSCO will be able to purchase materials and MRO through the Internet from any enterprises in the world. It will be possible for POSCO to do electronic sourcing, electronic bidding from the possible competitive suppliers and make a contract with the best supplier. Not only POSCO can benefit from the e- procurement but also suppliers can receive valuable information that make the suppliers draw up a production plan while reducing their inventory. Figure 3 shows the possible functions needed to consider in process of planning electronic procurement.
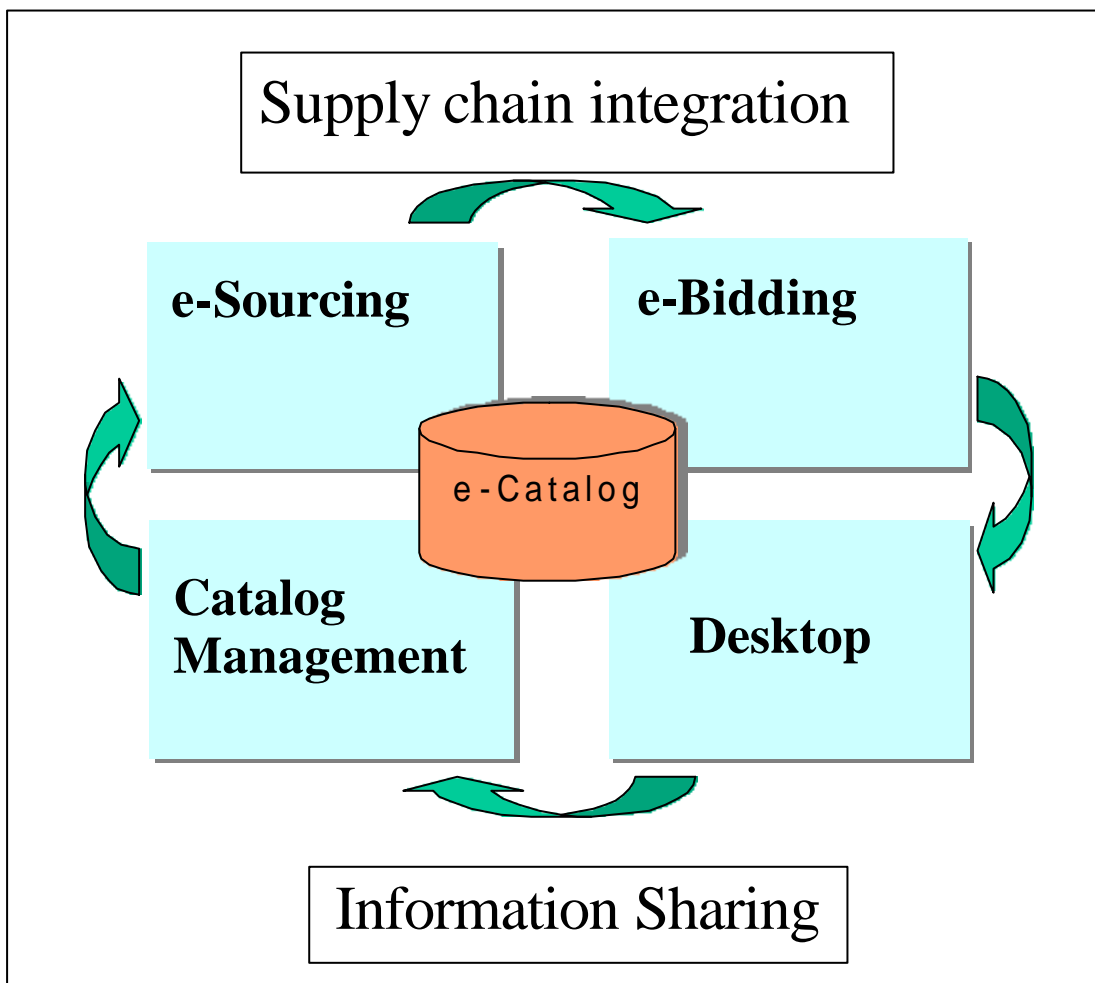
Figure 3. Considering Opportunity of Electronic Procurement

- E-Sourcing

- Catalog Management
- Supplier Portal

- e-Bidding
- Reverse Auction

- Desktop Purchasing
- Purchasing Card

- Order Tracking
- Vendor Managed Inventory
- Information Sharing
- EDI/EFT(Electronic Fund Transfer)
- Contracting Support
- Help Desk

- Automatic Matching for Payment
- Supplier Management
- Performance Evaluation
- Information Management

Source: Internal Data (2000. 5)

Electronic procurement of POSCO is divided into five sets; e-Sourcing, e-Bidding, Desktop Purchasing, e-Catalog management, and Information Sharing.

Figure 4 shows the implementation model of Electronic Procurement which is one of the ongoing projects called PI in POSCO.

Figure 4. Implementation Model of Electronic Procurement

Electronic Procurement of POSCO involves five main processes:

- **E-Sourcing**
  - In order to search for possible competitive suppliers in the world, POSCO will provide its procurement information including item catalogs, total purchasing amount, bidding schedule in the World Wide Web.
  - Approval & register process of the suppliers
    - □ Any enterprises in the world can register their information as the possible suppliers in the World Wide Web.
    - □ POSCO makes a search for the possible suppliers registered and selects the competitive candidates
    - □ Additional information about the candidates will be required. If necessary, a spot investigation will be conducted by POSCO
  - POSCO will launch its own Portal Site instead of using Portal Site of the third parties.

- **E-Catalog**
  - All raw materials and MRO will be included as the items of electronic sourcing in the long run. However, first of all, the subject of electronic catalog will be the item of e-sourcing, e-bidding, and desktop purchasing.
  - Management of e-Catalog
    - □ The suppliers can monitor and update their general information.
    - □ Many of the items as well as their information that is registered are managed by the suppliers.

■ E-Bidding

After electronic sourcing, all bidding process will be conducted on the Internet; bidding notice, delivering RFQ and its specification, evaluating proposals and quotation.

- Notice method of bidding
  - □ RFQ will be delivered to the possible suppliers selected by e-Sourcing
- RFQ
  - □ RFQ is made on the process of ERP
  - □ Delivering RFQ, and receiving the suppliers' proposals with quotation

- Bidding method
  - □ Open bidding: bidding price is open to the public, admission of the two quotation, award to the lowest bidder
  - □ Closed bidding: bidding price is not open to the public, award to the lowest bidder or total cost concerning quality, after service, etc.
  - □ Time limited bidding
  - □ Two phase bidding (specification, price)
- Notification of the lowest bidder
  - □ All participants get to know the results of bidding
- Negotiation after bidding
  - □ If necessary, negotiation is needed
  - □ Non-price like contract basis, delivery, etc will be negotiated.
- Integration of ERP data
  - □ Final quotation is linked to ERP
  - □ Negotiation list order of priority will be confirmed in the system of e-Bidding

■ Desktop Purchasing

- The users can send the purchase order to the suppliers through the Internet and then receive the demanding goods from the suppliers directly.

- PO is automatically created in ERP

- The scope will be enlarged from office supplies to MRO but raw materials will not included.

■ Information Sharing

The suppliers can monitor POSCO's inventory in the Internet. When it comes to the proper time, the suppliers should send the goods to POSCO automatically. Including POSCO's buying schedule, inventory information as well as the suppliers' production schedule, inventory information will be shared in the Internet to reduce the lead time of all the procurement process.

- All information belonging to POSCO and the suppliers will be shared

- Vendor managed inventory will be increased by the competitive suppliers.

Chapter 5. CONCLUSIONS AND IMPLICATIONS

The findings of this paper demonstrate that electronic procurement is shaping the way in which business of the future will be transacted. Although electronic procurement is a relatively recent phenomenon, those companies that are seizing the opportunities it offers are establishing a lead over the rest. Given the general recognition of the role of electronic procurement in overcoming national, geographical and temporal boundaries to trade, it is now clear that companies that wish to be at the forefront of global competition in their particular markets cannot afford to ignore electronic procurement any longer.

Main success factors of electronic procurement can be summarized as follows; first, focus on fast execution of electronic procurement (get first-mover advantage), second, get leading domain tenants for your marketplace early in the cycle, third, select the appropriate technology platform & enabling tools, leverage industry domain expertise & relationships, etc.

However, the effort required to implement electronic procurement successfully has to be sustained and be enterprise-wide. It requires support from the highest level, identification of the resource and expertise required and a willingness to rethink organizational processes. For this reason, electronic procurement is likely to reward those companies that are already nimble-footed and alert to the dangers and opportunities in their markets. The issue for the rest is whether they are sufficiently far-sighted to recognize the potential and threats that electronic procurement offers.

In a world which is increasingly competitive and where enterprises are required to undertake greater levels of risk in order to compete, those companies that fail to act now may find they have left it too late as electronic procurement has become a dominant way of doing business in their sector. By contrast, companies that have a vision, a strategy, and a long-term outlook will find that by embracing electronic procurement now, they will reinforce their

market position.

Throughout this paper, I have endeavored to describe the rationale for an enterprise to build an electronic procurement presence and showed the link with the competitive advantage that could be derived. In my opinion, this is the only way of getting real benefits from such a system. This strategy should include an understanding of the impact of electronic procurement on an industry structure, the potential for new business models and the opportunities for competitive advantage.

There is a view shared by some experts which advocates that companies should build an electronic presence without regard for the benefits, as costs are (apparently) low. I believe that this kind of vision is the cause for the disillusion of some companies after setting up their electronic presence, and the reason for some predictions of a decline in Web usage for commercial companies. That view has often been caused by a difficulty to clearly articulate the real benefits which could be derived from being online, and one of the objective of this paper is to clarify that point.

I propose the use of the business value model presented in this paper to identify which electronic procurement system a company should build, based on its current strategy. This can be done by matching the components of the business value to the particular company, and looking which of them are relevant to its products, processes and customers. The competitive advantage model could be used to study a specific industry and identify the threats and opportunities that electronic procurement-driven change will imply.

Future empirical and conceptual research will be helpful in refining and validating propositions, and will become possible when a sufficient number of experiences are collected and studied. It will be interesting to collect data on those companies like POSCO who really transformed their business model through e-procurement and derive critical success factors and sound business practices from them.

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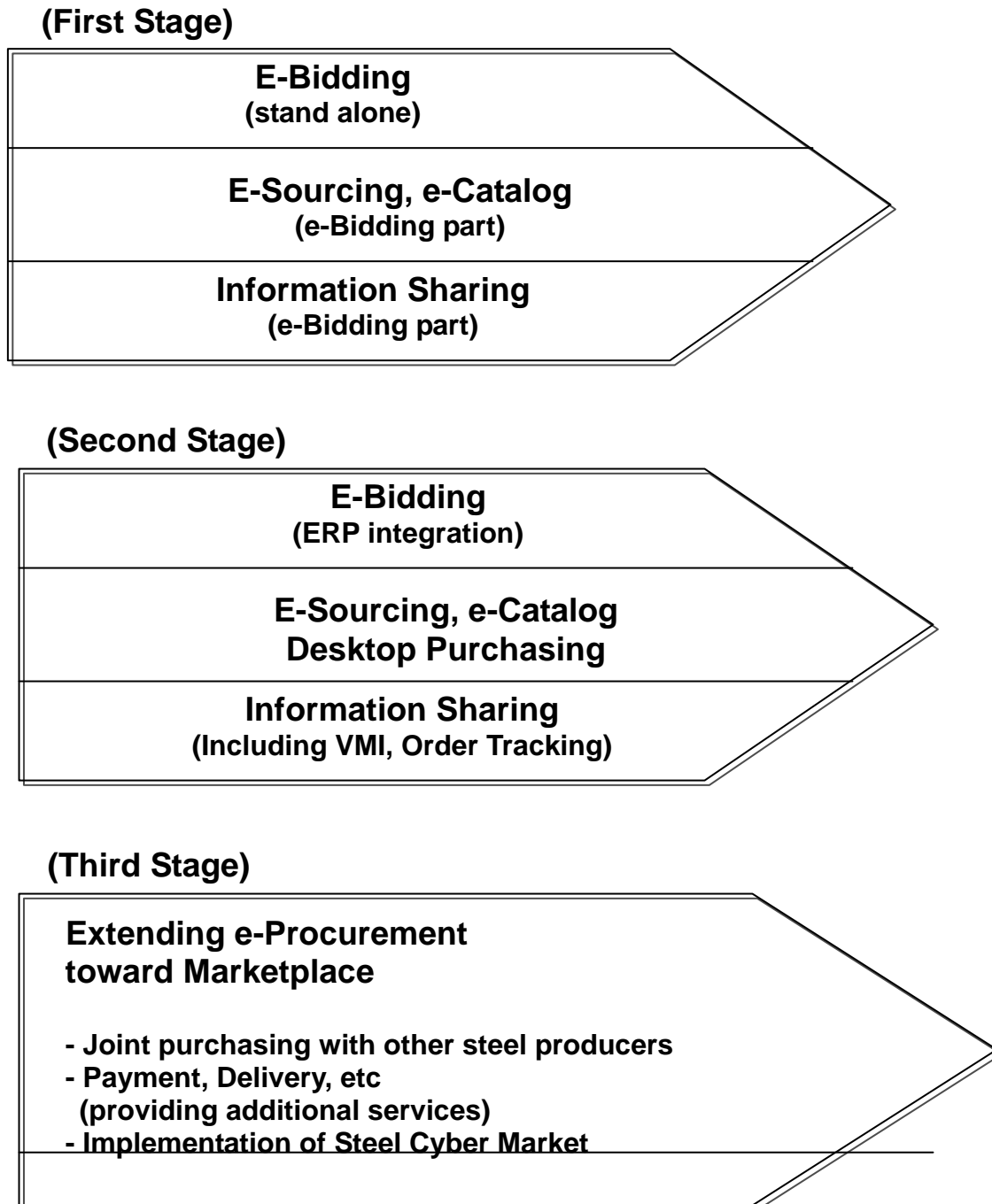
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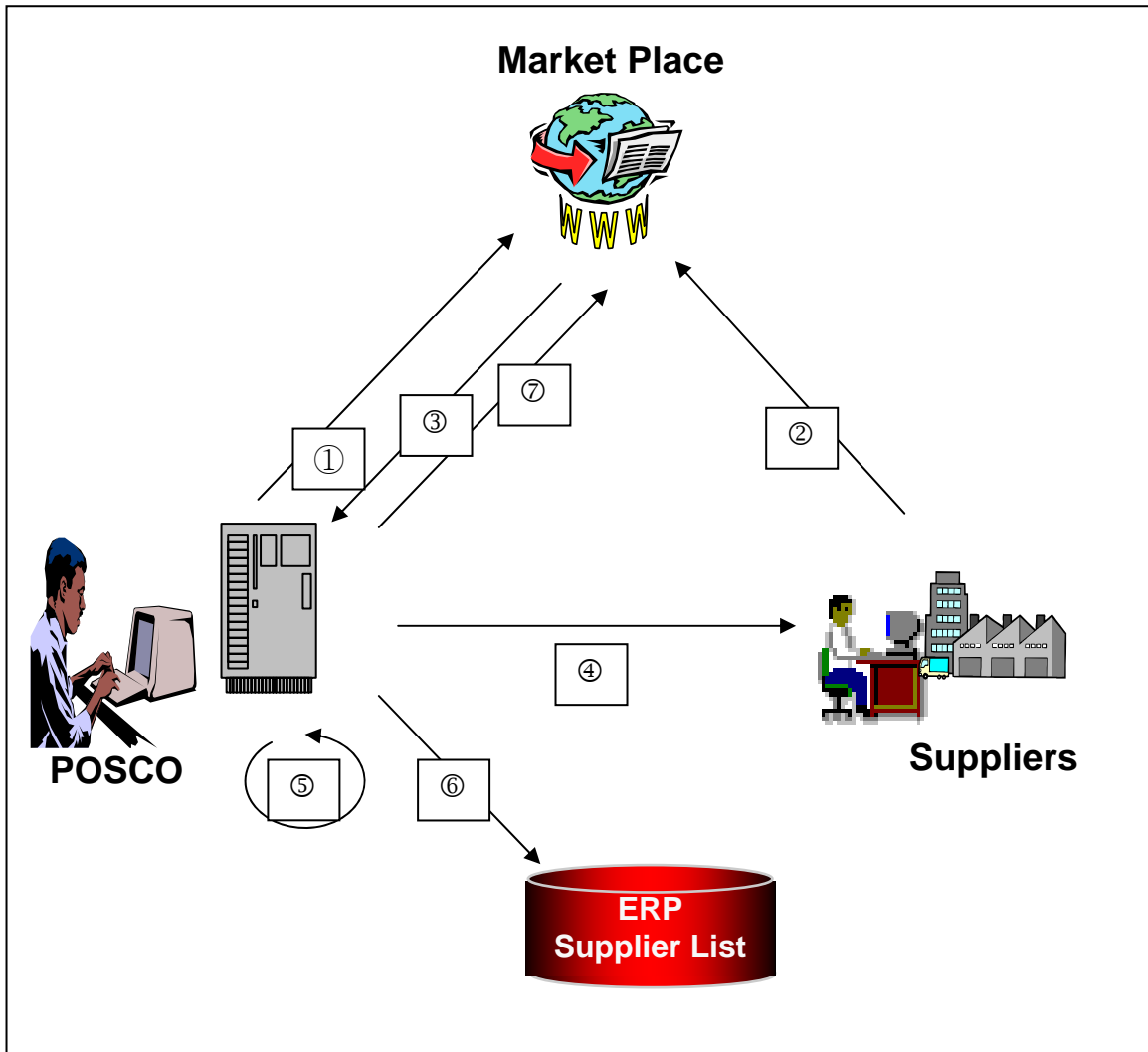
APPENDIX

Appendix Figure 1. Implementation Process of e-Procurement (POSCO)

(First Stage)

E-Bidding
(stand alone)

E-Sourcing, e-Catalog
(e-Bidding part)

Information Sharing
(e-Bidding part)

(Second Stage)

E-Bidding
(ERP integration)

E-Sourcing, e-Catalog
Desktop Purchasing

Information Sharing
(Including VMI, Order Tracking)

(Third Stage)

Extending e-Procurement
toward Marketplace

- Joint purchasing with other steel producers
- Payment, Delivery, etc
  (providing additional services)
- Implementation of Steel Cyber Market

* VMI: Vendor Managed Inventory

Appendix Figure 2. Business Model : e-Sourcing (POSCO)

Market Place

① ③ ⑦ ②

④ ⑤ ⑥

POSCO

Suppliers

**ERP
Supplier List**

1. Providing Purchasing Information

2. Registering Supply Intention
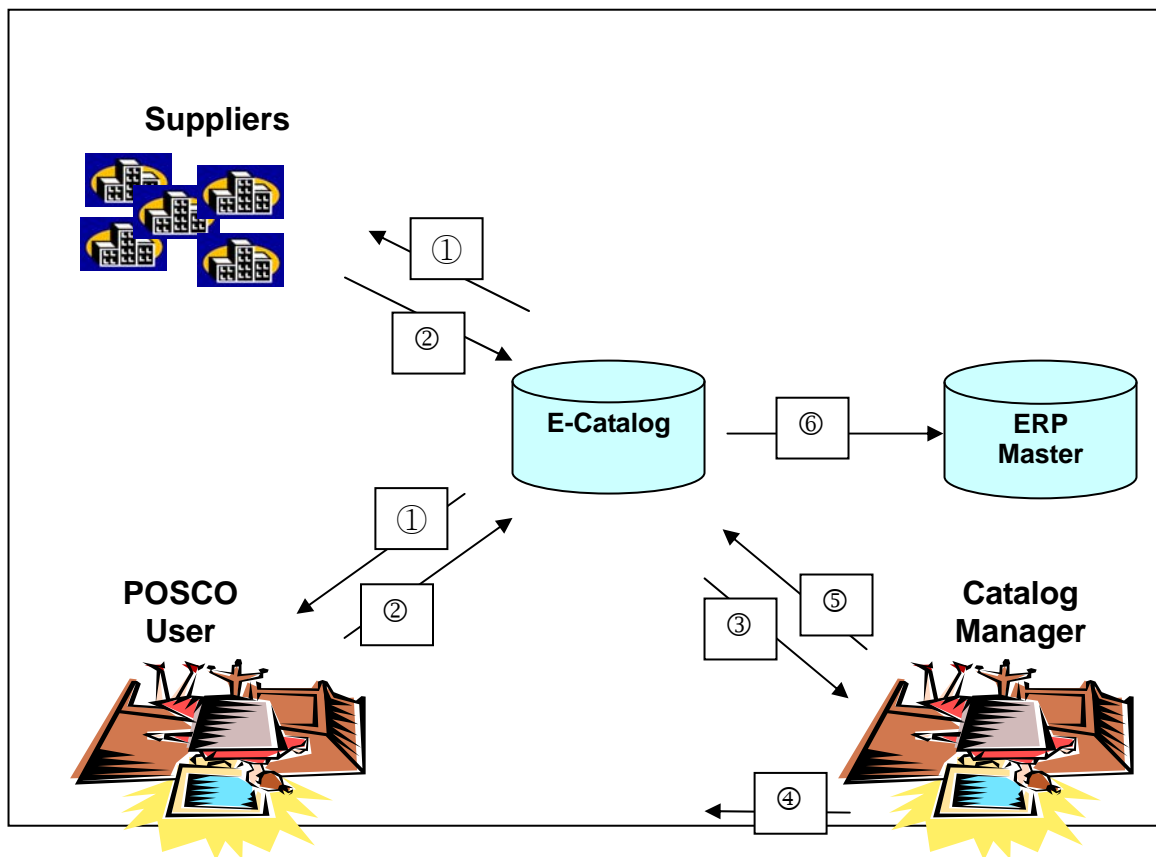
3. Receiving Suppliers' Intention

4. Evaluation and/or Inspection

5. Approval

6. Registration in ERP

7. Result Notification

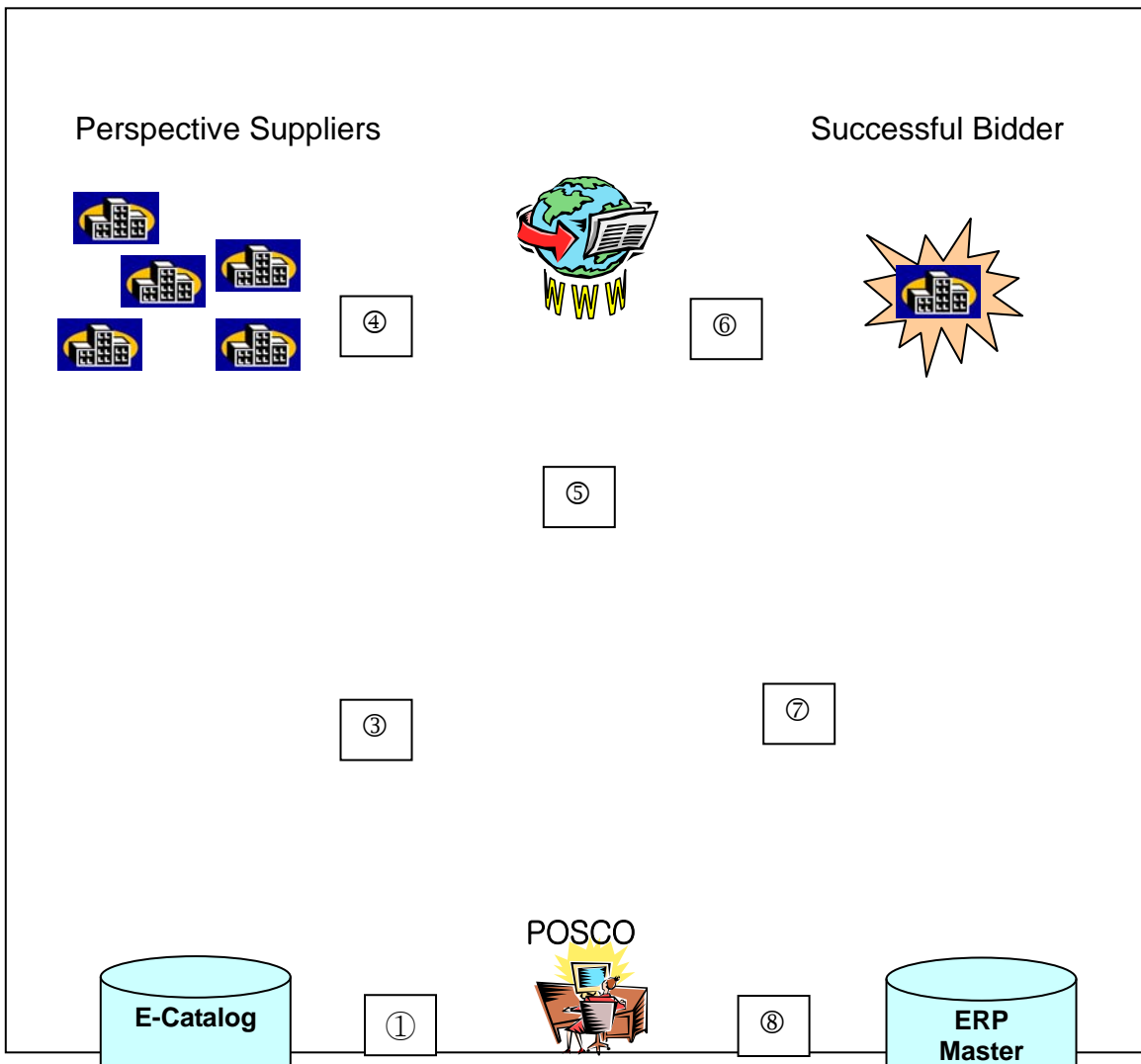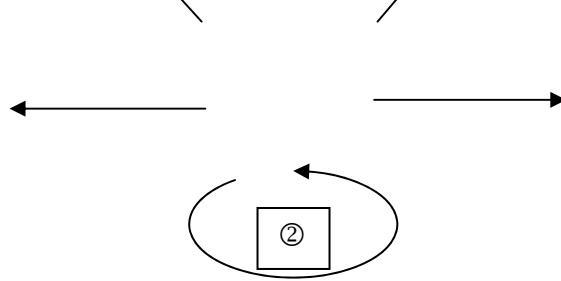Appendix Figure 3. Business Model : e-Catalog (POSCO)

1. Item Information

2. Registering Item Information

3. Requesting Approval

4. Approval

5. Registering Item

6. Entering in ERP data base

Appendix Figure 4. Business Model : e-Bidding (POSCO)

Perspective Suppliers

Successful Bidder

④

⑥

⑤

③

⑦

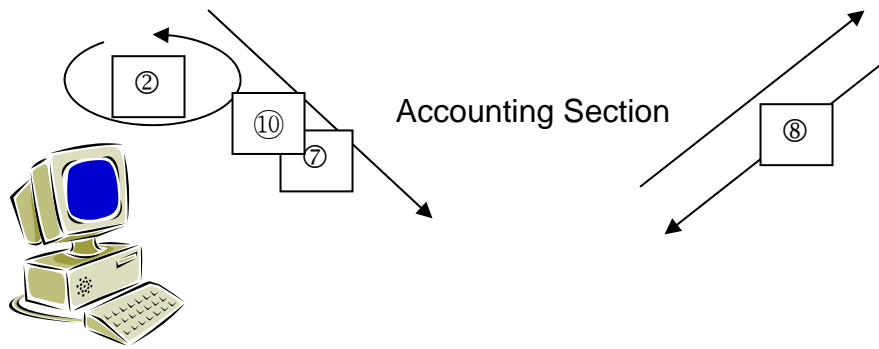POSCO

E-Catalog

①

⑧

ERP
Master

1. Searching Item

2. Evaluating Possible Suppliers

3. Sending RFP/RFQ

4. Participating Bidding

5. Carrying out Bidding-Open/Closed

6. Selecting Successful Bidder

7. Negotiation/Contract

8. Sending Final Information to ERP

Appendix Figure 5. Business Model : Desktop Purchasing (POSCO)
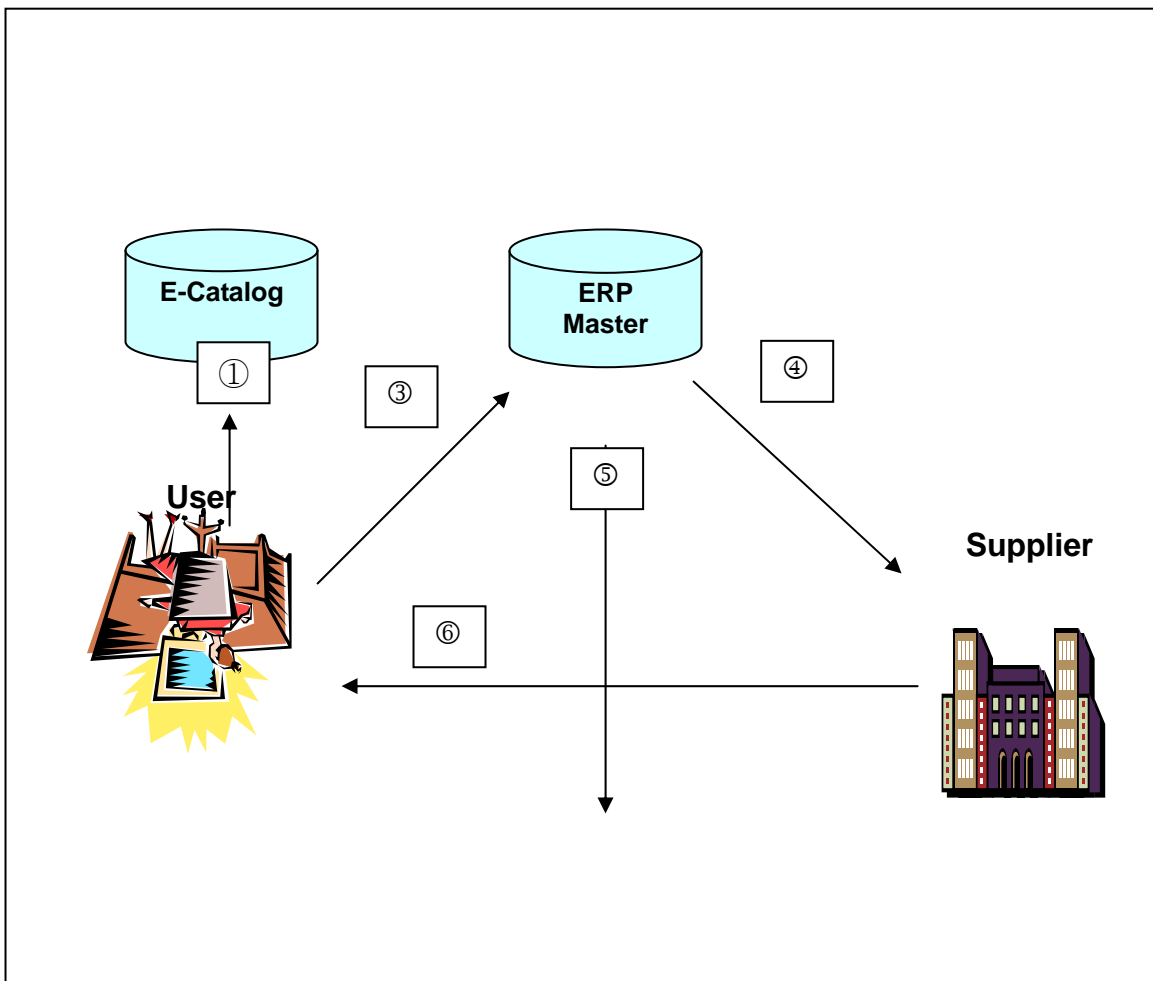
1. Searching Item

2. Issuing PO (Purchase ⑨ Order)/Approval

3. Sending to ERP

4. PC Transmitting

5. Sending PO Information

6. Receiving Item

7. Sending Receiving Information

8. Transmitting Invoice

9. Invoice Matching

10. Payment

Appendix Figure 6. Business Model : Information Sharing (POSCO)

Fire Wall

Web Form

Internet

EDI: Bank, Shipping Co, Customs. Suppliers. etc.

Web form: Non EDI adopted Suppliers