E-PROCUREMENT: PROMISES AND CHALLENGES

Procurement is the process that buyers use to purchase items from sellers. E-procurement uses online facilities to conduct some of the procurement activities. In general, e-procurement consists of five major activities: analyze the spending, manage the purchasing requirements, manage the procurement process, implement the new selected supplier(s), and manage the suppliers; see Appendix I for more details. E-procurement has three major players: the buyer, the bidding sellers, and the market maker. The market maker is a firm that provides the facilities, processes, know-how and infrastructure to create an electronic market for conducting competitive bidding.

With the advent of e-procurement, companies are thinking beyond their own firm to the effectiveness of procurement along their entire supply chain. Hau Lee, a supply-chain management expert, has reported on a study of 60 leading firms that focused on building effective supply chains. In this report, Lee concludes that the best supply chains are not just fast and cost-effective, but they are agile and adaptable as well, and they ensure that all partners’ interests remain aligned.

According to Lee, to be agile, firms must be able to respond quickly to short-term movements in demand and supply, and handle external disruptions smoothly. Therefore, one key task for buyers is to promote the efficient exchange of information with suppliers. To be adaptable, firms must be able to adjust to structural shifts in markets, generally by monitoring economies around the world and using intermediaries to spot new supplier bases and develop new markets. To be
aligned, firms must be able to help everyone in the supply chain work together closely so that better overall supply chain performance can be sustained. In short, all the firms must exchange information freely.

To realize this “Triple-A” (agile, adaptable, aligned) supply-chain thinking, firms operating in the global arena are increasingly embracing e-procurement to acquire new suppliers, enhance supply-chain collaboration, and facilitate efficient transactions. In addition to these strategic benefits, e-procurement can also help firms improve their operational efficiency by enhancing spend visibility, reducing material costs, consolidating procurement demands, facilitating faster procurement cycles, rationalizing their supplier base, and identifying new procurement opportunities.

These potential benefits or promises motivate senior executives to call upon CIOs (Chief Information Officers) to identify e-procurement solutions. As a result, CIOs have implemented e-procurement systems provided by vendors such as Ariba and B2eMarkets. While technology is a critical component, effective e-procurement does not come easily, and the promised benefits are not automatically realized. Success requires an integrated delivery approach, which means that besides technology, CIOs must also assess the applicability of e-procurement, determine appropriate objectives for e-procurement, and overcome the barriers to implementation.

**A THREE-STAGE MODEL FOR IMPLEMENTING E-PROCUREMENT**

To help CIOs better understand how to deliver the promises of e-procurement, we conducted interviews with procurement executives in 26 firms, asking them about the issues and challenges they faced with e-procurement implementation (see Appendix II). Their feedback inspired us to suggest a three-stage model for implementing e-procurement (Figure 1). CIOs can use this model to help procurement executives implement e-procurement successfully. In this section, where possible, we use the actual names of firms. But some firms have requested anonymity.

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Delivering on the Promise of E-Procurement

STAGE 1: ASSESSING E-PROCUREMENT APPLICABILITY

CIOs recognize that e-procurement is not a panacea. Like other innovations, e-procurement is not applicable to all product categories. Therefore, before embarking on e-procurement, CIOs need to help procurement executives assess its applicability, and critically ask whether e-procurement is suitable to their specific business environment. In our study, we found that CIOs can assess e-procurement applicability by analyzing three interrelated contexts: business, purchasing, and supplier (see Figures 2, 3 and 4).

**The Business Context**

E-procurement produces the most significant results when a firm’s business context is: in an unregulated industry (as opposed to a regulated one), has a competitive marketplace (as opposed to a monopolistic one), and where corporate policy supports e-procurement (as opposed to opposing it); see Figure 2. An example is the automotive electrical components marketplace, which is not regulated by government policies in most countries and is not ruled by just a few monopolistic companies in most countries.

 Buyers in eight product categories, in particular, reap substantial savings by using e-procurement, notes Ariba: maintenance, repair, and operation (MRO), plastics and rubber, electronics, transportation, engineering and construction, metals, paper packaging, and raw materials. Traditional procurement can achieve up to 5-10% savings in Asia. Ariba believes e-procurement can reap the following savings in these categories: MRO (25%), plastics and rubbers (22%), electronics (21%), transportation (16%), engineering and construction (15%), metals (14%), packaging (13%), and raw materials (10%); see Appendix III. In addition, Ariba has seen savings in these industries: public sector (35%), corporate services (23%), consumer (20%), high tech (20%), aerospace (17%), automotive (17%), energy and process (17%), diversified manufacturing (16%), and labor services (13%).

Firms purchasing from suppliers in unregulated industries and in competitive markets are more likely than other firms to be able to exploit these potential savings via e-procurement.

Moreover, if a firm’s corporate policies support e-procurement, deployment will be more effective. For example, Singapore Technologies Engineering implements a “first choice” policy to employ e-procurement solutions wherever opportunities arise.

**Figure 2. Stage One: Assessing the Business Context for E-Procurement**

<table>
<thead>
<tr>
<th>Contexts Favorable for E-Procurement</th>
<th>Contexts Unfavorable for E-Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Unregulated Industries</em></td>
<td><em>Highly Regulated Industries</em></td>
</tr>
<tr>
<td>Electronics components are purchasing items that are suitable for competitive online negotiation.</td>
<td>Online negotiation is not possible for aviation petroleum as the petroleum market is highly regulated in China.</td>
</tr>
<tr>
<td><em>Competitive Marketplace</em></td>
<td><em>Monopolistic Marketplace</em></td>
</tr>
<tr>
<td>Computers and peripherals are sold in a highly competitive marketplace where many competitive products are available.</td>
<td>The shipping industry in China is based in a monopolistic market where there are limited suppliers.</td>
</tr>
<tr>
<td><em>Supporting Corporate Policy</em></td>
<td><em>Against Corporate Policy</em></td>
</tr>
<tr>
<td>Singapore Technologies Engineering implements a “first choice” policy to employ e-procurement solutions wherever opportunities arise.</td>
<td>British Petroleum perceives that price-centric e-bidding could discourage suppliers from paying more attention to health and environmental factors.</td>
</tr>
</tbody>
</table>
firm. Its priority is production-quality compliance with regulatory standards.

In addition, e-procurement is not suitable where government intervention and local protectionism are strong. One executive from the brewery industry noted:

“Once we tried to get the supplier for beer manufacturing from outside my city [in China]. We received a letter from the municipal government stating ‘it is recommended that you buy it from local supplier XYZ.’ A buyer must maintain a good relationship with the local municipal government. Being co-operative is so crucial to our business success there. So we could not afford to be in conflict with the local government. We went for the local supplier despite the higher price.”

In the Chinese shipping industry, carriers also work with selected suppliers through close personal networks. Implementing e-procurement is seen as impractical because it could disrupt the existing socio-cultural practice of the business transactions. Hence, one shipping firm prefers to evaluate its suppliers on the basis of their guanxi (personal relationships), apart from process, quality or price, rather than by using competitive online bidding. One procurement manager explained the problem as follows:

“The shipping industry is monopolistic. There are only a few major players. We prefer the traditional way of procurement for main materials because we can have a visual knowledge of the product. Most importantly, the guanxi that we have with suppliers helps us understand each other better and enhance our long-term cooperation.”

Other firms may be conservative in adopting companywide e-procurement because of certain corporate policies. At British Petroleum (BP), for example, the social responsibility policy aims to provide healthy, safe and environmentally friendly products to society. For certain environmentally sensitive items, BP believes that price-centric competitive bidding can discourage suppliers from paying attention to health and environmental factors. BP’s second concern is public image: e-procurement may give society the impression that BP no longer cares about the environmental impact of its products, especially if its suppliers are not environmentally conscious. Therefore, although e-procurement could potentially provide significant savings to BP on certain items, it could also adversely affect the company’s reputation as being environmentally conscious. In sum, prospective adopters should avoid applying e-procurement in areas that conflict with such corporate policies.

**The Purchasing Context**

Firms are likely to benefit from e-procurement when the items they purchase have explicit product specifications (rather than tacit product specifications), when their spending volume is high (rather than low), when their spending can be consolidated across their organization, and when their products are manufactured according to common quality standards (rather than sensitive quality standards); see Figure 3.

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**Figure 3. Stage One: Assessing the Purchasing Context for E-Procurement**

<table>
<thead>
<tr>
<th>Contexts Favorable for E-Procurement</th>
<th>Contexts Unfavorable for E-Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explicit Product Specification</strong></td>
<td><strong>Tacit Product Specification</strong></td>
</tr>
<tr>
<td>The specification of electronic appliance products can be described explicitly and broken down into detailed components.</td>
<td>The specification of certain engineering or food products contains tacit knowledge and may not be articulated clearly in specific terms.</td>
</tr>
<tr>
<td><strong>High Volume</strong></td>
<td><strong>Low Volume</strong></td>
</tr>
<tr>
<td>In a centralized organization, spend can be consolidated across different departments.</td>
<td>In a decentralized organization, spend is fragmented across different departments, and such a spot-purchasing model may not be conducive to e-procurement.</td>
</tr>
<tr>
<td><strong>Standard quality</strong></td>
<td><strong>Sensitive quality</strong></td>
</tr>
<tr>
<td>Paper-packaging products follow a common quality standard (e.g., ISO 9001) that is suitable for a standard control procedure.</td>
<td>Certain pharmaceutical products and medicines contain sensitive quality standards (e.g., GMP) and thus require specialized quality-inspection processes.</td>
</tr>
</tbody>
</table>
Delivering on the Promise of E-Procurement

For example, one electronics appliance firm has explicit requirements for purchasing components for the appliances it manufactures: refrigerators, washing machines, cookers, vacuum cleaners, chainsaws, lawn mowers, and garden tractors. This firm can aggregate its procurement across more than 5 million product components with clearly specified quality-conformance criteria. Similarly, for computer and telecommunications products, RFPs (Requests for Proposal) are defined by unambiguous specifications and quality standards. In these situations, firms can consolidate their annual spend on operating resources and apply online negotiation tools to achieve substantial cost savings.

However, firms may not benefit from e-procurement when their purchased items have tacit product specifications, their purchasing demands are fragmented, and their products have sensitive quality requirements. For example, AMTEK, an electronics OEM in Singapore, manufactures highly specialized engineering products whose components cannot be easily specified in explicit terms. AMTEK’s suppliers must first inspect physical samples of the components to get a feel for how to reverse engineer and manufacture them. This process requires AMTEK’s engineers to work closely with these suppliers to produce and modify the components project-by-project. Therefore, it is difficult for AMTEK to exploit competitive online negotiations because it cannot issue pre-configured specifications for suppliers.

Likewise, BMW’s Asian automobile production facilities mainly manufacture special-design vehicles. The procurement team must follow specific quality standards set by German headquarters. So BMW’s first priority is quality assurance. Therefore, it prefers to cultivate long-term relationships with its suppliers to ensure the quality and flexibility of supply-chain management.

Other firms also may not benefit fully from e-procurement in certain purchases because they serve a niche market or their purchase volume is fragmented. For example, Venture is a low volume and high-mix contract manufacturer of printed circuit board assemblies. Their spot purchasing may not justify an e-procurement solution.

Finally, with a fragmented organizational structure, a steel manufacturer faces great challenges in coordinating the procurement activities of its three independent profit-centered plants in Asia. Although the firm can employ e-procurement to introduce process discipline, it cannot reap the full benefits unless it standardizes its procurement practices across Asia.

The Supplier Context

Firms can apply e-procurement when they have access to a large pool of suppliers (rather than just a few) and when their relationships with suppliers are mainly at arms-length (rather than as trusted partners); see Figure 4.

An example is General Dynamics, which has multiple business units with leading market positions in business aviation, mission-critical information systems and technologies, ship-building and marine systems, and land and amphibious combat systems. The firm manages more than 3,200 suppliers to procure products that range from copper piping to fasteners to bare printed wiring boards used to build ships, submarines, and advanced communication systems. E-procurement helped General Dynamics establish a standard procurement process to integrate its supplier bases, facilitate collaborative relationships, and prevent maverick buying (outside company standards).

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6 This case material is provided by Ariba.
But when only a few suppliers are available and supplier relationships are strategic partnerships with close collaboration, e-procurement may not be applicable. For example, ST Assembly Test Service, a semiconductor testing provider, found that e-procurement was not applicable because its purchases involved close support from its suppliers. Due to the limited number of suppliers that qualified after stringent assessment, the firm found that e-procurement would not achieve substantial benefits. Moreover, because the firm needs to research and develop most of the products for its clients, the procurement requirements are specific, and the firm only works with its approved vendor list.

Similarly, in certain product categories, Philips and DuPont have formed an R&D alliance that includes the supply of critical materials. Suppliers of some of their computer systems are also their customers, so they have a reciprocal relationship that precludes e-procurement because it might disturb this supplier-as-customer relationship.

A third example is Hewlett Packard (HP), which collaborates with a few specialized suppliers to develop some of its products. Procuring materials from other suppliers could infringe on these intellectual property agreements. As one procurement executive explained:

“Some of our buyers have shared R&D labs and have worked together in product development with the supplier for many years. The relationship involves not only trust and reputation but also IP [intellectual property]. By moving to e-procurement, the buyer may run the risk of dealing with product-rollout delay, questionable quality, unknown fulfillment capacity, wrong collaboration chemistry, and copyright infringement.”

Along the same lines, one Original Design Manufacturer in the electronics industry turned down e-procurement because its supply chain practice is based on the Vendor Managed Inventory model. Using this model, the firm manages its inventory with a six-month forecast and two-week replenishment schedule. The procurement cycles must be managed within two to three weeks. Choice of suppliers also depends on the outputs of the BOM (Bill of Materials) generated by the ERP (Enterprise Resources Planning) systems. E-procurement is a less attractive choice for this firm because it would introduce the higher risk of dealing with unfamiliar suppliers.

In a similar vein, an electronic manufacturing firm rejected e-procurement because it would affect the trust relationship it has developed over the years with its alliance partners, as explained by the procurement director:

“In the past, one of my suppliers went to great lengths to accommodate my urgent needs. He ran his plant overnight to meet an urgent requirement for an unexpected order and he bore the additional costs. If I awarded my businesses solely on price [through online auctions], this kind of reciprocity would be impossible.”

When a telecommunications firm’s purchasing initiatives are largely project-based and involve collaboration with niche suppliers, e-procurement is not applicable because the procurement items are highly specialized, and the volume may be insufficient for online bidding. Another example is aviation petroleum: online auctions of aviation petroleum are against government policy in China. Moreover, in the freight and shipping industry, firms may need to negotiate directly with the original manufacturer to buy MRO materials. A procurement director from a major Chinese shipping firm noted:

“Another reason we may not use e-procurement is that we are constrained to dealing only with a few suppliers for spare parts. Our ships are made in Japan. Therefore, for critical parts, we have to buy from the original makers.”

In this circumstance, prices are controlled by the key suppliers. The shipping company is concerned that if it invites smaller suppliers to participate in online bidding, they may bid irrationally to win the work, which could result in poor quality, time delays, and loss of income and reputation. Therefore, the shipper currently regards e-procurement as inapplicable.

So Stage 1 of the model, assessing the applicability of e-procurement to one’s environment, rests on studying the business context, the purchasing context, and the supplier context. Once applicability has been determined, the next step is to determine the goals, or objectives, for introducing e-procurement.

**STAGE 2: DETERMINING E-PROCUREMENT OBJECTIVES**

At the strategic level, e-procurement allows a firm to better coordinate, integrate, and leverage its spending to achieve savings across a dispersed organization. However, firms may have different purchasing needs. CIOs therefore need to help procurement professionals identify appropriate e-procurement objectives. We found nine objectives, discussed below; see Figure 5.

With the right objectives, CIOs can help procurement executives win support from top management by identifying performance measures. At the same time, CIOs can help internal buyers understand why e-procurement is important to them and how different
objectives can result in different degrees of e-procurement implementation. Below, we explain the importance of each of the nine objectives, drawing on the insights of procurement executives we interviewed. Note that these objectives are not mutually exclusive; purchasing functions can have different e-procurement objectives for different contexts.

**Objective 1: Reduce Costs**

Through competitive bidding, e-procurement provides an effective way to reduce material costs and transaction costs by finding the best quality products and services at the best price. For example, Singapore Technologies Engineering implemented e-procurement and reported an 18% savings of S$19.32 million (US$12 million) on its stock purchases in 2000. In every e-bidding event, it achieved savings of 15%-23%. Through online negotiation, HP Singapore saved more than US$320 million in non-stock procurement costs in 2004. Moreover, a UK-based international airline, which annually spent £4 billion with suppliers, used competitive bidding for in-flight catering, printing, logistics, ground fuel, crew accommodations, and ground operations, which resulted in savings of more than £80 million for 2003-2004.\(^\text{7}\)

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\(^{7}\) This case material is based on Ariba’s customer database.
Objective 2: Reduce Procurement Cycle Times

E-procurement can be used to streamline purchasing processes and reduce e-procurement cycle times. Here are four examples.  

- A US-based retail pharmacy applied e-procurement to enhance its order management processes, which dispensed a record 320 million prescriptions in 2001. The firm used e-procurement to procure not-for-resale goods in its distribution center, reducing the purchasing cycle from 7-10 days to several hours.

- A UK broadcast provider applied e-procurement to office mobile phones and consumables for satellite dish installation. The e-procurement gave it an integrated way to receive, reconcile and approve invoices electronically. As a result, within four hours, the firm could create a requisition online, obtain approvals, send orders to preferred suppliers, receive the goods and an electronic invoice from a supplier, and clear the invoice for payment.

- A US-based commercial bank reduced its procurement cycle time by consolidating a broad range of spend categories, including professional services, contingency personnel, technology projects, and telecommunications services. It also used e-procurement to automate stock replenishment, requisition, and receiving, thereby reducing the time from low-stock notice to full receipt at the third-party dock.

- A US fashion retailer employed e-procurement to manage its merchandise and non-merchandise goods (such as cash registers, shopping bags, and janitorial supplies) across 358 retail stores. E-procurement helped the firm reduce the negotiating cycle time from an average of four months to six weeks, realizing per-unit savings of 10-20% off baseline prices.

In addition, e-procurement systems also provide a formal way to drive best practices and processes across the business. Here are three examples.

- A container port service provider applied e-procurement to revamp its traditional processes of phoning and faxing suppliers, keying-in purchase orders by hand, and manually tracking contract terms and conditions, expiration dates, and applicable discounts.

- An electrical product manufacturer used e-procurement mainly to purchase pallets and injection molds. The new process provided a common method of documentation for the buyers and suppliers to communicate using the same language. Embedding this standard process in the e-procurement system gave the manufacturer a comprehensive way to purchase across different divisions, reducing fragmentation.

- An Application Service Provider (offering best-of-breed enterprise systems over the Internet for a flat monthly fee) applied e-procurement to instill process discipline into its internal purchasing function. It used the e-procurement system to automate the convoluted purchasing procedures into a standard seven-step process, replacing paperwork by electronic approvals. The firm also used e-procurement to document its more efficient purchasing procedures to maintain its ISO 9001 certification.

Objective 3: Align with Requirements of Parent or Partner

Overseas subsidiaries might adopt e-procurement simply because their parent firm has a policy mandate. For example, Philips (Lighting) Singapore implemented e-procurement because Philips Europe headquarters has a global agreement with Ariba. ConocoPhillips and Johnson & Johnson (China) have global standards for information systems implementation. When e-procurement does not match the specified standards, though, system implementation is not possible.

In another situation, Venture Corporation, a leading global electronic service provider, employs online auctions at the request of headquarters or its key customers, irrespective of whether it will produce savings or process efficiencies.

Objective 4: Increase Professionalism

Traditionally, the procurement department is perceived as a low-expertise organization. E-procurement can upgrade procurement professionals’ skills and enhance their supply-chain management competencies. HP Singapore, for example, transferred different market makers’ expertise into its procurement team, which not only enhanced its team’s skills but also promoted the team’s professional identity within the firm. Singapore Technologies Engineering replicated its e-procurement practice through the full-service
model. With this knowledge transfer, it is able to conduct independent market making, perform spend visibility analysis, and manage its supplier network.

For a slightly different reason, a European stainless steel manufacturer in Asia adopted e-procurement and its associated practices (including standard reporting systems, policies, and procedures) to promote the professionalism of its purchasing center. The procurement team must negotiate and coordinate with three strong internal stakeholders in China, Thailand, and Malaysia. Having a professional image helps the center build trust among the three production plants.

A government agency, the Defense Science & Technology Agency, Singapore, adopted e-procurement to bring greater value to the Ministry of Defense. Through innovative and more cost-effective procurement practices, it is promoting its professional image and increasing its social capital, thereby increasing the level of public trust.

In an international aerospace engineering firm, an executive experienced in e-procurement explained:

“The market maker offers a lot more than an auction service and software. It provides you with a purchasing knowledge base and a large capacity in terms of skill sets. You can learn about how the market works for many different kinds of products, suppliers and product-quality levels. To us, the auction software is the least significant portion; the most important portion is knowledge of how the market works.”

Objective 5: Increase Spend Visibility and Maintain Contract Compliance

E-procurement can be used to analyze spend categories to gain visibility into what is being bought, identify different spending patterns, and negotiate more effectively with multiple suppliers. With a more visible spend pattern, firms can use e-procurement to maximize their product search, explore their pricing patterns, and facilitate the aggregation of purchasing among departments.

For example, after a major merger, one UK utility used e-procurement to integrate the contract databases of the two merged firms so they could analyze spend behavior. Senior management gained a synergetic view of post-merger benefits from this analysis.¹⁰ To take another example, BP and AMTEK (an electronics OEM based in Singapore) employed e-procurement tools to make their spend patterns more visible so that they could quickly identify not only pricing patterns among suppliers but also how much they had saved for each item in each category. Their analyses also reinforced contract compliance.

A procurement director in the electronics industry explained the benefits of using e-procurement tools to analyze historical spend:

“Spend analysis will give me a big spending picture and tell us what we’re spending, whom we’re spending it with, the kinds of parts we bought, and the final price. We are also able to identify which departments are using agreements negotiated by the procurement office so [that] we can effectively ask for a contract compliance cost.”

Moreover, improved visibility not only increases compliance but also provides a more credible basis for future negotiations. A purchasing manager in an engineering firm noted:

“The spend data help us quickly prepare online negotiations with suppliers. We are able to use accurate numbers to negotiate the terms, and this gives us more credibility.”

Objective 6: Extend the Supplier Base

When under global competitive pressure, firms need to rationalize the scope of their supplier search. Oftentimes, market makers, such as Ariba, B2eMarkets and TradeOne, provide not only e-procurement systems but also industry-specific procurement knowledge and a credible supplier database. One of their value propositions is to help firms extend their search for qualified suppliers around the world. For example, a port management agency has a mandate to renew its supplier base annually, to maintain procurement competitiveness. Due to time constraints, the agency employs a market maker’s network to acquire new suppliers in a relatively short period of time. Using the extended supplier base, the agency can quickly become familiar with potential new suppliers.

Objective 7: Consolidate the Supplier Base

Through e-procurement, firms can more deliberately consolidate their supplier base to a preferred few, thereby reducing the legal costs of managing suppliers, significantly save on inventory, and minimize side-dealing. Here are three examples:

- One financial service firm’s indirect goods were traditionally purchased by employees from various sources, which led to an erosion of its buying power and the problem of mav-
Using e-procurement, the firm reduced its supplier base to aggregate its purchasing power. In so doing, the firm was able to analyze its spend patterns, achieve a contract compliance rate of over 95%, and lower its legal and administrative costs.

- An international airline introduced an e-procurement initiative to consolidate its supplier base from 14,000 to 2,000, which gave it more informed spending. The airline reduced its inventory costs by £200 million and transaction costs by 40%, while improving employee productivity by 48%.

- A consumer goods firm integrated e-procurement with its enterprise system, which helped it analyze supplier performance in each spend category. It then consolidated internal spending, removed low-performance suppliers, and rewarded its good suppliers by giving them larger volumes to balance the reduced prices of the items procured.

**Objective 8: Build Better Relationships with Suppliers**

Another benefit of consolidating the supplier base is that companies build better relationships with the remaining suppliers. One procurement director from an international oil firm explained the rationale:

“If we have 20 purchasing officers to manage 2,000 suppliers, then each officer has to manage 100 suppliers. But each officer can only visit a supplier once a year. This will not allow the officers to build good relationships with each supplier, and they also cannot perform quality audits effectively.”

**Objective 9: Enhance Corporate Governance**

Firms implement e-procurement to bring in an additional corporate governance mechanism. For example, the Development Bank of Singapore (DBS) adopted an e-procurement system to ensure buying-process transparency, to meet the requirements of its external auditor. Similarly, Johnson & Johnson (China) introduced e-procurement to reduce maverick buying or “leakages” (side-dealing) when negotiating local contracts. P&O Nedlloyd (a European firm offering freight services) justified e-procurement as the means to introduce a fair method of contract negotiation and consistency into its procurement process.

A procurement expert at Ariba noted:

“A major element today in going into online markets or e-procurement is the transparency it provides... But a lot of the pressure now is not [only] coming from within but [also] from external sources. Laws such as the Sarbanes Oxley Act [SOA] compel all American companies’ CEOs and CFOs to certify [their] actions and financials. This pressure is pushed downwards to the lower levels of management, thereby fueling the demand for e-procurement solutions.”

These, then, are nine reasons why companies implement e-procurement. But there are obstacles to doing so, as we discuss next.

**STAGE 3: OVERCOMING E-PROCUREMENT BARRIERS**

There are seven common barriers to implementing e-procurement successfully:

1. High setup costs
2. Organizational inertia (especially from internal buyers)
3. Suppliers’ fears of competitive bidding
4. Ineffective public infrastructure
5. Restrictive regulations from domestic governments
6. Fears about a market maker’s capability
7. Fears about a market maker’s integrity.

The following discussion illustrates ways firms can overcome these barriers; see Figure 6.

**Solution 1: Minimize Setup Costs**

High initial setup costs are a common barrier for buyers, generally because most buyers have little understanding of this new procurement approach. In Singapore Technologies Engineering’s experience, the cost of market-making services is up to US$1.2 million per year. The license fee for e-procurement software can cost US$2,500 per user per year (normally, a firm needs to purchase licenses for 25-50 users). Some buyers may work with multiple service providers who charge up to US$300,000 per project. Prospective e-procurement adopters may have trouble justifying such investments.

To justify setup costs, prospective adopters could negotiate pilot e-bidding events to illustrate savings, or use a full-source model to bring in expertise, or conduct their own e-procurement in-house. In one case, a logistics firm developed a new venture-investment model to acquire initial funding internally.

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11 This case is based on Ariba’s customer database.
E-procurement brings not only new processes but also requirements that employees acquire new skills and perform new roles. Therefore, organizational inertia is a major barrier to e-procurement implementation, especially in state-owned organizations, where employees in traditional procurement departments fear for their job security. Moreover, like any new technology, e-procurement requires people to give up their comfortable, longstanding relationships with suppliers. E-procurement can even take away tacit benefits embedded in the negotiation process and make procurement professionals feel they are losing control of their purchasing operations. One procurement manager from a multinational computer manufacturer stated:

“In the old way of procurement, the procurement staff would be taken out for lunch by the suppliers. E-procurement would take away all these benefits that come from dealing with suppliers. They also felt that they were going to lose control of their purchasing process.”

For decentralized organizations, such as HP and DBS, aggregating demands from local departments might...
not be easy. For a European steel manufacturer, although procurement is coordinated by the Singapore office, the actual procurement is conducted at each plant by different purchasing heads. New suppliers are often chosen in consultation with each plant, each with its own specific preferences. These purchasing heads have difficulty reaching a consensus about common purchasing processes.

Another concern centers around maintaining harmonious relationships with suppliers, as one purchasing executive at a personal computer manufacturer in China explained:

“Sure, it’s attractive. But it depends on which way we achieve it. Now the way of [e-procurement] is to ask them to compete with one another. Competition can make things better, but sometimes it can be cruel. I think our management has no intention to hurt the sentiment of those incumbent suppliers given that we have done business with them for a long time.”

The procurement team at Singapore Technologies Engineering developed six effective ways of dealing with such inertia. First, the procurement team used continuous education, training, and communication to overcome the common perception among the internal buyers that online auctions are used solely to drive down prices. At most procurement events, the team pointed out the other criteria used, such as production capacity, product quality, and delivery capability.

Second, to assuage internal buyers’ concern that the lowest price would mean poor product/service quality, the procurement team constantly collaborated with the technical departments in conducting detailed reviews of prospective suppliers.

Third, to alleviate internal buyers’ worries that low prices would mean poor after-sales support, the procurement team let these buyers consider past references and reputation as an integral part of contract-award criteria.

Fourth, to overcome senior procurement staff’s fear that e-procurement might harm long-term relationships with incumbent suppliers, the CPO consciously included incumbent suppliers in every online auction event, and ensured that incumbent suppliers would be awarded a certain percentage of contracts. After a while, suppliers realized that incumbents actually gained more advantage (and more business) than new suppliers from this policy.

Fifth, the procurement team also learned that supplier collusion could be avoided by careful preparation. Thus, the team selected at least three suppliers in different regions to participate in online negotiations and invited independent experts to inspect the auction event. These actions allayed this concern of Singapore Technologies Engineering’s internal buyers.

Sixth, in the buy-in phase, e-procurement directly challenged the purchasing professionals’ abilities, which made them feel a loss of control over their familiar procurement practices. Therefore, in the initial stage, the CPO insisted that e-procurement systems should empower, not take over, the procurement team. The CPO explained: “You need to make the procurement staff feel that they are in charge, not the market maker’s people.” Once the procurement team assumed ownership of the initiative, the staff became dedicated to driving results.

**Solution 3: Alleviate Suppliers’ Fears of Competitive Bidding**

Suppliers worry that e-procurement is nothing more than another negotiation game to reduce prices and exclude other important factors, such as product quality, delivery capability, and trustful relationships. Therefore, they are reluctant to release sensitive market information and participate in the bidding activities. Two suppliers explained:

“Definitely not! I don’t want people knowing how much I get the products for and how much I sell them for. I don’t want to display everything in public. Why should I participate in something that will ruin my business!”

“I was offered the prime agent’s role by a Fortune 500 company to get all the suppliers I knew to sign up for its e-procurement events. The offer was very attractive and the company was shocked when I said ‘NO’ to them. I did so because I was not sure if the company was going to be fair in using such a system, and I thought it would coerce suppliers to beat each other’s prices by leaking information.”

To mitigate this perception, for instance, HP’s procurement team spends time with suppliers, helping them understand that, although e-procurement may lead to competitive online bidding, it also opens up more business opportunities to them. One of the procurement executives explained how he helps suppliers dissipate their fears:

“A supplier may initially supply 10% of the components to a buyer, for example. However, after the auction, it may be awarded 30% of the components due to its competitive offering. Even if the price is reduced, the total business for the supplier may increase.”

Occasionally, buyers must require incumbent suppliers to decide to either adopt e-procurement or give up...
their business. Some buyers emphasize to incumbent suppliers that new suppliers (especially those in China and India) are the most enthusiastic adopters of e-procurement because they are hungry for Multi-National Corporation (MNC) contracts. Having a contract with a MNC helps new suppliers potentially gain access to contracts worth millions of dollars in the future, as well as build initial trust with other potential large buyers.

In the post-contract phase, Singapore Technologies Engineering experienced suppliers wanting to bail out of a contract when they realized they would gain little profit from the online auction because of price fluctuations in the market. In response, the procurement team developed three operational directives for its internal buyers to avoid this problem:

1. Avoid items that involve intellectual property ownership: Intellectual property induces loyalty issues, and we may only get responses from a few suppliers. Items with intellectual property ownership are therefore non-auctionable.

2. Define specifications explicitly: Vague specifications create confusion for suppliers and add unnecessary transaction costs for us. If a purchasing item is classified as a “soft buy,” with no explicit specifications, traditional negotiation may be more effective than online bidding.

3. Invite only qualified suppliers: Before undertaking online negotiations, the procurement team must pre-qualify the suppliers on two criteria: commitment and delivery capability. And all online bidding must have at least three suppliers to ensure sufficient competition.

Solution 4: Identify an Alternative Infrastructure

In Asia, telecommunications infrastructures are not yet well established. Suppliers often encounter hardware, software, and network problems when participating in e-procurement activities. For example, in India, electricity breakdowns can occur three times a day, which affects the sending of electronic RFxs to a buyer and interrupts Internet-based auctions. One Singapore-based construction firm encountered such a problem. When it was conducting online bidding for construction-related materials, a supplier from China initially held the leading position. Suddenly, though, the Internet connection was disrupted. When the supplier returned to the bidding a few minutes later, it had already closed. As a result, this key supplier refused to participate in future events. The construction firm’s purchasing director worried that this event might cause distrust in the supplier community: “You may make suppliers think that you’re playing games with them.”

Prospective adopters can try to apply leverage to Internet-related service providers to improve this situation. For example, some suppliers use cyber cafés to participate in e-biddings while other big firms actually prepare a bidding site for their suppliers (with a private room equipped with Internet access, telephone and other office facilities).

Solution 5: Collaborate with Government Agencies to Comply with Regulations

In some Asian countries, suppliers are prohibited by government regulations from participating in e-procurement activities. For example, ConocoPhillips conducted one reverse auction in Vietnam in 2003 for drill-pipes worth US$600-700K. The event was nearly canceled because the Vietnamese government did not support the reverse auction, believing that it would infringe on its domestic profit-sharing contract policy. This policy, which also exists in Indonesia and Malaysia, states that only purchases within a certain monetary range can be conducted using e-procurement. For example, the Indonesian government only allows e-auctions for oil project contracts with a total value of under US$2 million.

Therefore, before embarking on e-procurement in these countries, prospective buyers must collaborate with the domestic government agencies to avoid legal disputes.

Solution 6: Require Market Makers to Demonstrate Their Capabilities

Market makers must provide professional services, such as spend analysis, pre-qualification analysis, product knowledge, supplier knowledge, technical knowledge (e.g., how to manage an e-auction platform), and a call center service for the entire procurement process. When they cannot demonstrate these technical capabilities, buyers may distrust them. In the experience of one high-end computer system provider, one market maker failed to restore an online bidding event for an incumbent supplier. As a result, the entire purchasing project failed, and the buyers resisted further use of e-procurement because they did not trust the market maker’s expertise.

Before engaging in e-procurement, a telecom firm asked its market maker to demonstrate its expertise in

\[12\] The Vietnamese government restricts competitive bidding in the petroleum industry to avoid decreasing the overall revenue gain in the industry.
Philips Electronics realize that when they turn to e-MNCs such as Nestlé, BP, Johnson & Johnson, and confidentiality is a prime concern. Firms such as ConocoPhilips (energy) and Nestlé with competitors in other e-procurement projects. This concern especially of market makers that work and pricing information to competitors. Buyers raise agreement and will reveal highly-sensitive product the market maker will not abide by the non-disclosure agreement. Likewise, buyers can be concerned about market makers’ integrity. As one procurement executive of an aerospace firm explained:

“Our suppliers worry about why there is a middleman. They want assurance from us. In fact, our suppliers have little trust in the market maker. They trust us. Therefore, we must work with the market maker to build partnership trust with suppliers.”

Likewise, buyers can be concerned about market makers’ integrity. Generally, their major concern is that the market maker will not abide by the non-disclosure agreement and will reveal highly-sensitive product and pricing information to competitors. Buyers raise this concern especially of market makers that work with competitors in other e-procurement projects. Firms such as ConocoPhilips (energy) and Nestlé (food) operate in price-sensitive industries. For them, confidentiality is a prime concern.

MNCs such as Nestlé, BP, Johnson & Johnson, and Philips Electronics realize that when they turn to e-procurement, their market maker will gain in-depth knowledge about their supply chain management, product costing, procured materials, and transfer pricing. Therefore, market maker reputation becomes an important criterion for forming this partnership. MNCs may therefore even evaluate the turnover of a market maker’s information security and other staff.

For instance, in a food manufacturing firm, the amount of packaging material purchased may reveal the firm’s production volume (i.e., supply information). Disclosure of this information could lead to price fluctuations in the market. A project manager of the market maker could be recruited by competitors and could divulge this sensitive information to them. Therefore, market makers need to cultivate their integrity-based trust by maintaining a reputation for tight information security and strict obedience to non-disclosure agreements.

As shown, seven obstacles to e-procurement do exist and can arise from all three parties – buyers, sellers, and market makers. But there are ways to overcome these obstacles.

**CONCLUSION**

This study examines how CIOs can assist purchasing executives to evaluate whether e-procurement is suitable for their firm, determine the objectives of e-procurement implementation, and address the key concerns facing buyers and suppliers. Although we examined firms operating in Asia, these findings are undoubtedly applicable to e-procurement implementation around the world.

Our research has important implications for CIOs. As e-procurement has increased in importance over the past five years and has demonstrated its potential to significantly impact procurement practices, CIOs are well positioned to play a key role in its implementation. Thus, they need to view themselves as change agents and champions, constantly looking for ways that technology can add value to the firm. As champions of e-procurement, CIOs should not focus narrowly on technological features but should explore more broadly how e-procurement can be used to streamline procurement and improve the management of procurement spending. In fact, research has shown that a 10% decrease in procurement costs can result in a 50% increase in profit margins. Hence, there is a compelling need for CIOs and other senior executives to find better ways to manage procurement spend and reduce procurement costs. The three-step framework shown in Figure 1 and discussed in this paper can help CIOs and purchasing executives implement e-procurement successfully.

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APPENDIX I: THE ELEMENTS OF E-PROCUREMENT

The term procurement pertains to the activity chain, beginning with the identification of purchasing needs, spend analysis, and signing the contract. E-procurement pertains to conducting some of these activities on-line.

Two types of e-procurement. E-procurement adopters typically choose between two modes of service. One is the full-service mode where the buyer manages the procurement activities using the market maker’s facilities. Once an adopter assimilates an e-procurement method into its buying organization, it often moves to the second mode – the self-service mode – where the buyer conducts its own procurement processes and performs its own online negotiations using in-house facilities. In this self-service mode, the buyer purchases the online-bidding system and related tools to conduct its own e-procurement activities.
In general, the process of e-procurement consists of five major activities (see Figure 7). For a detailed definition of the e-procurement process, see Aberdeen Group, “E-procurement: Negotiating Value in a Volatile Economy,” An Executive White Paper, April, 2001. (http://www.aberdeen.com/)

1. **Spend analysis:** This activity involves cleansing purchasing data by analyzing the buyer’s spending patterns to identify opportunities for cost savings, demand aggregation, and supply-base consolidation. This analysis is also called spend visibility. Purchasing specialists use data mining software to cleanse historical procurement data to make the firm’s spend patterns visible. This data mining task involves collecting and validating purchasing data, reorganizing item and supplier codes, rationalizing the supplier base, and optimizing the supply base by adding new suppliers.

2. **Requirements management:** In this activity, the buyer defines procurement specifications, such as product requirements, quality standards, and desired service levels. Frequently, the purchasing specialists send these specifications in RFQs to suppliers listed in the Approved Vendor List. Alternatively, the buyer may reach out to suppliers...
Delivering on the Promise of E-Procurement

using the market maker’s supply-intelligence database, which contains credible commodity and supplier knowledge.

3. **Procurement management**: Having selected pre-qualified suppliers, including incumbents and new suppliers, the buyer can use an intermediary or market maker (such as FreeMarkets, B2eMarkets, or eBreviate) to mediate the market-making process. The intermediary offers different kinds of electronic platforms to enable electronic bidding (i.e., a reverse auction) and facilitate online negotiations between the buyer and the selected suppliers. Such systems offer different auction (bidding) strategies, such as standard downward bidding, index bidding, multi-variable bidding, and transformation bidding. Using the electronic platform, multiple suppliers bid competitively through online negotiations so that the buyer obtains an optimal price point.

4. **Supplier implementation**: Based on the online negotiation, the buyer awards the contract, conducts post-qualification assessment, and evaluates whether or not the selected suppliers can meet the specified requirements.

5. **Supply management**: The buyer conducts post-bid analysis, reviews cost structure, validates quality conformance, and maintains regular assessments of both the incumbent suppliers’ and new suppliers’ capabilities.

<table>
<thead>
<tr>
<th>Firm’s Name or Pseudonym</th>
<th>Industry</th>
<th>Headquarters Location</th>
<th>E-procurement used for the following purchase categories</th>
<th>Functions of Research Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>MobileCo (China)</td>
<td>Telecom</td>
<td>Asia</td>
<td>Routers, message services, telecommunications facilities</td>
<td>Procurement audit</td>
</tr>
<tr>
<td>National Healthcare Group Singapore</td>
<td>Healthcare</td>
<td>Asia</td>
<td>Drugs, utility services (such as electricity). Classified as Medical and non-medical supplies</td>
<td>Group purchasing office</td>
</tr>
<tr>
<td>Philips</td>
<td>Manufacturing</td>
<td>Europe</td>
<td>Electronic components</td>
<td>Purchasing</td>
</tr>
<tr>
<td>P&amp;O Nedlloyd</td>
<td>Transportation</td>
<td>Europe</td>
<td>Labor contracts, terminal services, tiers, and bus services</td>
<td>Asia Pacific business (operational costing)</td>
</tr>
<tr>
<td>PSA (Port of Singapore Authority)</td>
<td>Public sector</td>
<td>Asia</td>
<td>Transportation services</td>
<td>Contracts and procurement department</td>
</tr>
<tr>
<td>SIA (Singapore Airlines)</td>
<td>Transportation</td>
<td>Asia</td>
<td>Commercial goods and services (e.g., in-flight catering)</td>
<td>Commercial supplies</td>
</tr>
<tr>
<td>Singapore Pools</td>
<td>Public sector</td>
<td>Asia</td>
<td>Indirect purchasing (e.g. high-quality paper)</td>
<td>Operations &amp; settlements</td>
</tr>
<tr>
<td>STATS (ST Assembly Test Services)</td>
<td>Manufacturing</td>
<td>Asia</td>
<td>Testing services</td>
<td>Corporate-wide procurement</td>
</tr>
<tr>
<td>SteelCo</td>
<td>Process manufacturing</td>
<td>Europe</td>
<td>Tools, dyes, lubricants, bearings, packaging materials, spare parts, stationery</td>
<td>Procurement in Asia</td>
</tr>
<tr>
<td>Singapore Technologies Engineering</td>
<td>Manufacturing</td>
<td>Asia</td>
<td>Forging products, air freight, electrical and cable installations</td>
<td>Global procurement</td>
</tr>
<tr>
<td>Sun Microsystems</td>
<td>High-tech</td>
<td>US</td>
<td>Bandwidth, network equipment and services</td>
<td>IT operations, contract management</td>
</tr>
<tr>
<td>Venture Corporation</td>
<td>Manufacturing</td>
<td>Asia</td>
<td>Electronic parts</td>
<td>Supply management</td>
</tr>
</tbody>
</table>

Figure 8 (Cont.): Profile of Research Participants
APPENDIX II: ABOUT THE FIELD STUDY

Our sample comprises firms based in Singapore with headquarters in North America (23%), Europe (19%) and Asia (58%), as shown in Figure 8. With the assistance of Ariba, we selected firms with experience with different e-procurement practices, mediated through market makers (e.g., FreeMarkets, TradeOne, SESAMi, and B2eMarket) or their own procurement office. We selected cases where we could explore why firms employ e-procurement, the nature and scope of the barriers they have encountered, and the challenges in their existing procurement practices.\footnote{Yin, R. K. Case study research: Design and Methods, Newbury Park, California, Sage, 1989.} The research team conducted interviews from May to November 2004. We received further feedback from these firms in November 2004 and conducted follow-up interviews during March-May 2005. Each interview typically lasted for one to two hours.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Average saving using online negotiation</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRO and services</td>
<td>25%</td>
<td>Equipment, rental and leasing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legal services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Machine-tool repair</td>
</tr>
<tr>
<td>Plastics and rubber</td>
<td>22%</td>
<td>Blow molded (plastic)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compression molding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extrusion (plastic)</td>
</tr>
<tr>
<td>Electronics</td>
<td>21%</td>
<td>Cables and harnesses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Capacitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Component manufacturing</td>
</tr>
<tr>
<td>Transportation</td>
<td>16%</td>
<td>Express freight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freight forwarding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LTL freight</td>
</tr>
<tr>
<td>Engineering and construction</td>
<td>15%</td>
<td>Automotive robotic equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Broaching machines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction and mining machines</td>
</tr>
<tr>
<td>Metals</td>
<td>14%</td>
<td>Aluminum, Cobalt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Copper and brass alloys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Die casting</td>
</tr>
<tr>
<td>Paper packaging</td>
<td>13%</td>
<td>Cartons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Labels</td>
</tr>
<tr>
<td>Raw materials</td>
<td>10%</td>
<td>Acids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glycerin</td>
</tr>
</tbody>
</table>

APPENDIX III. PRODUCT CATEGORIES SUITABLE FOR E-PROCUREMENT
(SOURCE: ARIBA, SINGAPORE)