Moving Procurement Systems to the Internet: The Adoption and Use of E-Procurement Technology Models

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This paper reports the results of a research project addressing the current state of e-procurement technologies. The results indicate that the final equilibrium may include several technologies, each one serving a different segment of the market. This multiplicity of solutions is likely to further delay the transition of the industry to its growth stage. Companies are approaching e-procurement technologies with very different strategies. We identify two main types of companies. The first type is moving aggressively to adopt e-procurement technologies, frequently experimenting with various solutions. The second type adopts a more conservative strategy by selectively experimenting, typically with one technology. This latter group relies on these limited experiences to provide the capabilities to move quickly into the technology as a dominant design emerges. The results suggest that e-procurement technologies will become an important part of supply chain management and that the rate of adoption will accelerate as aggressive adopters share their experiences.
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Introduction

Online procurement (e-procurement) has been identified as the '… most important element of e-business operational excellence for large corporations' (Barua *et al.*, 2001). An e-procurement technology is defined as any technology designed to facilitate the acquisition of goods by a commercial or a government organization over the Internet. E-Procurement technologies — including e-Procurement software, B2B (business-to-business) auctions, B2B market exchanges, and purchasing consortia — are focused on automating workflows, consolidating and leveraging organizational spending power, and identifying new sourcing opportunities through the Internet. Future developments are expected to extend these technology models to create collaborative supply chain management tools (Brunnelli, 1999; Carabello, 2001). Not surprisingly, e-procurement technologies have been credited with providing significant benefits to companies who venture into them. These advantages include reducing administrative costs, shortening the order fulfillment cycle time, lowering inventory levels and the price paid for goods, and preparing organizations for increased technological collaboration and planning with business partners (Croom, 2000; Roche, 2001; Gamble, 1999; Greenemeier, 2000; Murray, 2001). The relevance of these advantages suggested a rapid migration from traditional to e-based procurement models. Accordingly, just a few years back, market analysts predicted that Internet B2B transactions — a subset of e-procurement technologies — would increase from approximately $600 billion in 2000 to over $6.3 trillion by 2004 (Forrester Research, 2000).

Unfortunately, this tremendous expected growth rate has been revised downwards. Recent market observations indicate that the adoption and integration of e-procurement technologies into the business mainstream is occurring at a much slower than expected pace. One reason is the implicit association that investors have made between e-procurement technologies and the business-to-consumer (B2C) models responsible for the Internet bubble. More often, the slow-down has been associated with technology-related issues. A 2001 study by the Conference Board points to problems in the implementation side and concludes that 'organizations are …finding (e-procurement) implementation more complex, more expensive, and more time consuming than they originally envisioned' and that consultants have been 'widely criticized for overstating the business case for e-procurement' (Conference Board, 2001). Companies were jumping onto the e-procurement bandwagon without fully understanding the inter-organizational collaboration and network effects underlying these technology models, the investment required to move the right information from suppliers to employees, and the complexities of integrating these technologies with existing Enterprise Resource Planning systems (Gilbert, 2000).

In this paper we present the results of a research project undertaken to map current practices of e-procurement technologies, understand the drivers — benefits and risks — of their adoption, and project the expected evolution of these technologies in the near future. The findings are based on a survey supplemented by extensive discussions with industry experts and purchasing managers who are using e-procurement technologies.

The analysis indicates that the slower-than-predicted growth is not the consequence of a single problem. Rather, e-procurement technologies are still in their early stages of the traditional technology S-curve, in which alternative technology models are rapidly evolving and users are still sorting out the winning model. This process is particularly complex because the final outcome may well be that different market segments will adopt different technology solutions. Because a well-defined business process is still unavailable, companies are using different strategies to approach these technologies. Some companies — aggressive adopters — are investing significant resources to experiment with alternative solutions with the expectation of identifying the technological winner and translating this leadership position into competitive advantage. Other companies — conservative adopters — are taking a 'wait and see' approach. These companies are investing selectively in a reduced set of technology alternatives with the expectation of learning enough to be ready to move as soon as a winner emerges. Regardless of the current strategy of a company, the overall consensus is that e-procurement technologies will become an important management tool to enhance the perform-ance of supply chains. The current focus on indirect goods as a way of experimenting with the technology is expected to evolve into procurement processes that facilitate inventory management and the purchase of capital goods.

The actual benefits and risks of e-procurement technologies and managers' evolving perceptions about these benefits and risks will determine the speed at which the technology moves from its developmental infancy to the adoption and maturity stages. However, the perceived risks that are holding back companies from investing in e-procurement technologies are numerous. In addition to technology-related risks, there are risks associated with the integration of these technologies with existing information systems, with the business model that these technologies impose on supplier–customer relations, and with the security and control mechanisms required to ensure their appropriate use.

The evidence presented in this paper should enable finance, accounting, information technology, purchasing, and top managers to better prepare and plan for the future of e-procurement technologies in their organizations. After briefly outlining the research process in the second section, the paper maps the current state of e-procurement technologies in the third section by describing the positioning of the various technologies in the different market segments and by developing a typology of e-procurement technology adoption strategies. Next, it describes in the fourth section how companies are experimenting and learning about these technologies. The fifth section quantifies the economics of e-procurement technology through expected investments and savings, and elaborates qualitatively on the benefits and risks associated with them. The conclusion provides a summary of the current state of e-procurement technologies and expectations for future adoption.

The four specific models of e-procurement technologies examined in this paper (defined in Table 1) are e-procurement software, market exchanges, B2B auctions, and purchasing consortia.

Research Method

The data for this research project come from responses to a questionnaire designed to map the current state of e-procurement technologies. The database was made available to the authors from a consulting firm specializing in e-procurement market research.[1] The data were collected during the last quarter of 2000 and first quarter of 2001. The questionnaire was administered with the cooperation of 14 major financial institutions that made their client lists available for the survey. The database includes 168 U.S. organizations, mostly for-profit corporations representing a variety of industries, including mining, traditional and high technology manufacturing,