

Electronic Procurement in Today's High-Tech Firms

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Submitted to
IMP 19th Annual Conference

April 30, 2003

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ABSTRACT

Exploratory qualitative interviews conducted with purchasing decision makers across various high-tech industries in Eastern Europe are compared to those in Central Europe and the United States. Findings suggest that Information Technology is perceived as less valuable by European firms and is utilized to a lesser degree. Multinational companies operating in Eastern Europe appear to be focused on developing the product quality and operational efficiency of local Eastern European suppliers and less concerned about facilitating their adoption of IT procurement systems.

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Research has identified various factors that impact an organization's supplier selection process. Past studies have investigated buying center characteristics (Bonoma, Zaltman, and Johnston 1977), relationships with contact persons (Liu and Leach 2001), transaction specific investments (Heidi and John 1989; 1990), elements of the buying situation (Robinson, Faris and Wind 1967; McQuiston 1989) trust and commitment (Morgan and Hunt 1994) as well as perceived value and customer satisfaction (Anderson and Narus 1998). However, recent advancements in *information technology* (IT) may be the factor that is most critically reshaping organizational buying today. In the past ten years, information technology has provided organizational buyers easier access to greater numbers of suppliers at a time when many companies have strategically decided to limit the number of suppliers that they do business with. As a result, organizational buyers' negotiating power has increased as selling firms attempt to retain their customers in a more competitive environment. Likewise, through electronic data interchange (EDI) and other electronic purchasing systems, information technology has enabled buying and selling firms to share marketing information to enhance forecasts, implement effective just-in-time delivery, and reduce inventory costs. Thus, it can be argued that the advancements in information technology may be one reason why organizational buying and procurement strategies have recently become boardroom topics.

Information technologies have quickly integrated into standard business practice in the industrialized nations. Research on marketing channels suggests that as purchases become more critical to the firm, more elaborate governance structures are developed. This suggests that firms may desire to be in close proximity of critical suppliers, have frequent face-to-face contact, and may even locate themselves in industrial clusters (e.g., heavy manufacturing areas, silicon valley) in order to have quick access to and maintain a watchful eye on these suppliers. However,

antidotal evidence from trade research suggests that the importance of close proximity may quickly become a thing of the past; even for products that are complex and deemed to be critically important to the buying firm. Suppliers seem to be rapidly becoming willing to accept bids from global suppliers as long as they have the IT capabilities to communicate and transact in an acceptable manner. Thus, as technology in electronic data interchange continues to develop, EDI is becoming less of a transaction specific investment solidifying relationships among specific buyers and sellers. Instead, it is becoming a standard requirement of suppliers to do business.

In technology intensive industries buyers often find the number of potential suppliers is dramatically reduced as the technical complexity of the desired product increases. As such, high tech firms in developing countries often find that the only suppliers of critical products are located in more industrialized nations. Thus, for these buyers, sourcing globally for technically complex products is not a choice but a necessity. Firms in these countries may have more experience at evaluating geographically distant vendors and establishing working exchange relationships with them. Likewise, they may have expectations that are more realistic. However, currently little is known about the differences in e-procurement procedures and practices between firms in industrialized and developing countries.

This paper intends to further our understanding of the world marketplace by examining the procurement practices of high-tech suppliers across several countries in Central and Eastern Europe and in the United States. In particular, this examination will focus on the extent to which the smaller and less developed countries of Eastern Europe utilize IT procurement as an integral part of their purchasing strategy. We are specifically interested in discovering the processes by which IT purchasing has been or is being integrated into firms within these economies. In order to investigate these relationships, a series of exploratory qualitative case studies were conducted. Case studies were developed based on in-depth interviews with key purchasing personnel and

engineers in high-tech industries. Although cases were qualitative in nature, they did follow many of the prescriptions for case research outlined by Johnston, Leach, and Liu (1999; 2000).

Interviews were conducted in the cities of Los Angeles, Berlin, Prague, Budapest, and Vienna between April and June, 2002.

EXCHANGE RELATIONS AND ORGANIZATIONAL BUYING

Several approaches have guided empirical research on the development and maintenance of business-to-business relationships. Many studies draw from industrial and organizational psychology, social psychology, and social exchange theory. These approaches typically emphasize managing dependence and uncertainty in exchange relationships and the processes leading to and the outcomes of the development of customer satisfaction (e.g., Anderson and Narus 1990; Dwyer, Schurr, and Oh 1987; Frazier and Summers 1984). In addition transaction cost analysis (TCA) and relational contracting theories have been utilized in various marketing studies (e.g., Anderson and Weitz 1992; Heide and John 1992). This approach focuses on identifying and developing efficient structures for governing transactions. Another approach, the interaction model, suggests that a cooperative atmosphere, mutual trust, and the exchange relationship are developed through mutually satisfying experiences among exchange partners (Håkansson 1982; Hallen, Johanson, and Seyed-Mohamed 1991). These experiences are referred to as exchange episodes that involve four exchange elements (i.e., product or service exchange, information exchange, financial exchange, and social exchange). This seemingly straightforward development process is, however, highly complex as relationships are subject to on-going challenges, uncertainties, and contingencies that necessitate unilateral and/or bilateral adaptations in the exchange relationship (Ford 1980).

Research on organizational buying behavior adds to the business relationship literature by providing an understanding of the process and motivations of customer purchases and vendor selection (i.e., Johnston and Bonoma 1981; Robinson, Faris, and Wind 1967; McQuiston 1989; Sheth 1973). For example, Johnston and Lewin (1996) have developed an integrated model of past research that indicates that much of organizational buying behavior appears to be related to the levels of risk associated with a given purchase situation. Purchase risk is a function of 1) the importance of a particular purchase, 2) the complexity associated with the purchase, 3) uncertainty of the purchase outcome, and 4) the need to reach a decision quickly. Furthermore, situational and relational variables can also be related to organizational buyers' perceptions of risk. For instance, the ability to source from multiple vendors as well as the strength and depth of relations with current vendors both tend to reduce perceived levels of risk (Johnston and Lewin 1996).

Organizational buyer behavior models specific to global purchasing situations have also been developed. For example Monczka and Giunipero (1984) developed a process model for a successful international purchasing program. This five-phase model has two attributes that are unique to global purchasing, commitment and skills enhancement. Commitment refers to obtaining top management's support for such a program. Skills enhancement refers to growing and improving the knowledge base of working with and within a firm based in another country. Similarly, Birou and Fawcett (1993) identified four factors to be important to global sourcing: 1) top management support; 2) developing communication skills; 3) establishing long-term relationships; and 4) developing the skills unique to international sourcing.

Marketing scholars interested in this area have been rethinking many of the previously embraced theories and standard business practices that are proving to be outdated in today's highly competitive global marketplace (Håkansson and Snehota 1995; Webster 1992; Cannon and

Perreault 1999). Leach, Liu, and Brooks (1999), in their qualitative study of firms operating in Russia, found evidence that locally owned and managed firms differ markedly from Multinational firms operating in the same less-developed economy. Specifically, while multinational firms showed evidence of being market oriented (evidenced by their customer-orientation, continuous market-sourcing behaviors, and an emphasis on supply-chain management), Russian companies behaved more like typical product-oriented firms and often stressed their desire to have products that were a higher quality than competitors irrespective of customer demands.

Many companies continue to struggle with global sourcing and need to better understand the requirements of effective global sourcing strategies (Peterson, Frayer, Scannell 2000). Recent research in the area of organizational buyer behavior and relationship marketing has identified (1) procurement in the high-tech sector, (2) global competitiveness, and (3) cross-cultural values to be three areas of organizational buying behavior where further research is warranted (Sharma and Sheth 1997). The current study intends to provide some insight into these areas by investigating exchange relationships in less developed countries and the extent to which these relationships are maintained electronically.

Based on the previous studies reviewed above, we expect companies in Eastern and Central Europe to have various exchange relationships. Multinational companies will most likely operate similarly regardless of whether they are operating in more or less developed economies, and utilization of e-commerce with customers sourcing with IT procurement may be the means that allows firms in the less developed areas of Eastern Europe to compete regionally and perhaps globally.

Thus, our primary research question is, “how extensive are IT maintained exchange relationships in high-tech firms operating in Eastern Europe compared to those operating in Central Europe and the U.S.?” and the following propositions are explored.

P1: High-tech multinational firms will be engaged in IT procurement to a larger degree than smaller firms, particularly those in the less-developed economies of Eastern Europe.

P1: Strong IT relationships may mitigate or replace buyer's preference for suppliers in close geographic proximity.

METHODOLOGY

The data for this study was collected through interviews conducted by two or more graduate business students. All interviewees were asked the same set of questions concerning their purchasing behaviors. The unit of analysis is sourcing decisions. The focus of the study was how purchasing decisions were made with regard to critical components in manufacturing firms. The type of organizations interviewed consisted of large multinationals, small independent firms, and investment groups. The companies interviewed were located in the United States, Germany, Austria, Czech Republic, and Hungary. Because the target companies consists of large manufacturing firms whose top management at headquarters might not be involved in individual sourcing decisions, it was important to identify decision makers knowledgeable about sourcing operations.

In order to collect accurate and appropriate information to examine our propositions, reliance on a single manager might not enable an assessment of either the reliability of information or potential sources of error in such reports. Because of this concern, extreme care was taken to ensure that appropriate personnel responded to the questionnaire (Johnston, Leach, and Liu 1999). The types of personnel interviewed held the following titles: Manager of Strategic Purchasing, Director of Strategic Purchasing, Purchasing Manager, Manager-Sourcing and Logistics, Materials Manager, Project Engineer, Manager of Supplier Relationships.

Eighteen interviews were conducted. Eight of which were conducted in the U.S. Two were conducted in Berlin, three in Prague, five in Budapest, and two in Vienna. The companies interviewed covered various high-tech industries (e.g., semiconductors, aerospace, technology

solutions providers, electronic component technology, laser technology, video games, radio frequency (RF) power amplifier technology, and precision casting).

Based on insights from previous research, an interview protocol was developed and used with the U.S. companies. The same set of questions, with slight modifications due to cultural aspects, was then used with the interviews in Germany, Austria, Czech Republic and Hungary. The protocol was created to assess the following key elements of purchasing behavior: (1) supplier integration: integration of suppliers into organizational strategies and objectives, effects of supplier integration on competitiveness, and level of integration; (2) information transfer: strategic information transfer between supplier and manufacturer and proprietary knowledge transfer; (3) electronic purchasing: influence of electronic purchasing and sourcing on organizational purchasing; (4) geography: influence of geography on supplier management; and (5) goals: a qualitative assessment of future procurement goals of the organization (see Table).

Interview responses were transcribed, and transcripts were scrutinized by six marketing experts. Initially, these judges worked to reach a consensus to the question, “how extensive are IT maintained exchange relationship in Eastern Europe as compared to Central Europe and the U.S.?” Then transcripts were reevaluated in an attempt to provide a richer description of the circumstances that are and are not facilitating the development of e-commerce, e-procurement, and IT facilitated exchange partnerships in Central and Eastern Europe.

FINDINGS

While internet-based supply chain management systems, electronic purchasing and other advanced technology sourcing methods have revolutionized the purchasing process for most large companies in industrialized economies, our research indicates that this is not necessarily the case when it comes to high-level or strategic suppliers for hi-tech companies. For the most part,

the more traditional communication and order processing methods still apply when it comes to specific and critical products – even if they are ordered in volume. This is particularly true in Europe, where EDI and other supply chain management systems seem to have not caught on as much as in the United States. The only electronic medium that was used in purchases regularly was communication via email. However, even email seemed to be less important in Europe than the U.S. A laser manufacturer in Austria stated, “Faxes and phone are the standard; they are the way to do business here.”

Several companies indicated that most critical components are ordered to specification. In such cases, the ordering system and decision-making process are particular to each transaction. As such, it is not economically viable to set up an electronic transaction process. One stated the difficulty of using e-procurement when 80% of their purchases were made by multiple people in the organization (i.e., a buying center).

An Austrian transformer manufacturer reported that electronic purchasing only makes sense for “C” commodities (i.e. low value items, such as tools, that are generally procured locally). As a comparison, an American manufacturer of wireless products reported that they use EDI for roughly 90% of their purchasing. However, they do not generally use it for the most critical components.

A Czech division of an American semi-conductor manufacturer reported that they do not use EDI because most European suppliers are “not equipped” to use EDI. According to this company, this is particularly true with French companies. Similarly, a German manufacturer of optical products indicated that only one of their current suppliers uses EDI or similar systems.

In Budapest, a large multinational computer company stated, “Currently we do not purchase any product electronically. We tried, however, we do not generate the kind of purchasing volume that would justify the annual costs to operate and participate in the electronic

marketplace. In the U.S., where our corporate office can purchase mass quantities for all of their offices, EDI and electronic purchasing makes sense; but for us right now with our size it does not make sense.”

In sum, the answer to our first question seems to be that e-procurement in Eastern Europe is the exception rather than the rule. Smaller Eastern European suppliers appear to lack the ability to buy and sell electronically, while larger multinationals are not convinced of the value and/or cost-saving benefits of electronic procurement due to the nature of the majority of products that they buy and the relatively smaller size of their market. Whereas the American firms viewed e-procurement practices proactively, firms in Eastern Europe took a more cautious and skeptical view; preferring traditional forms of communication and personal relationships. For example, an American electronics manufacturer stated, “Almost everything is purchased using EDI, electronic auctions are used when we can not get a component through the usual channels, and traditional purchase orders are used less than five percent of the time. If a supplier does not have EDI capabilities they are no longer a supplier. It is not worth adding the overhead internally to do it any other way.” Similarly, a US computer game manufacturer states, “When customers demand EDI from their manufacturer then it is important for suppliers to get the IT up and running.” These statements can be contrasted to a Czech company that was happily working with Dell because they had a strong personal relationship with a very credible sales rep. Similarly, a multinational computer company in Hungary stated that each of their business units has “examples of electronic purchases,” however; email and phones were primarily used.

One main theme that was evident across many of the interviews with multinationals operating in Eastern Europe was the need to develop their local suppliers. As such, organizational buyers were more interested in the quality and efficiency of local suppliers than whether or not they have the IT capabilities to sell and fill orders electronically. This was

important for multinationals manufacturing for the regional market, but was felt to be particularly critical by multinational firms that were producing for the global market. A multinational power systems manufacturer in Budapest had, as part of their mission, an objective to, “grow the local supplier base and migrate local suppliers over to being global suppliers.” One way that they have been able to rapidly develop local suppliers is by taking their world-class U.S. and Western European supply companies and requiring that they move their operations to Hungary. The importance of developing local suppliers was surprising given the level of global sourcing done by these companies.

Interview results suggest that the means by which local suppliers are developed is as varied as the companies themselves, but occurs through any one, or a combination of the following: (1) technology and knowledge transfer, (2) aid in the implementation of universal quality standards, and/or (3) audits and on-site inspections. For example, one semiconductor firm with operations in the Czech Republic brings their integral suppliers on site for a 2-day seminar that focuses on strategic planning and relationship building. These seminars also give suppliers the opportunity to see how the corporation conducts operations first-hand. Only two types of information is not shared with suppliers during these seminars or at any other time: company financial information and total volume of purchases across all suppliers. Six Sigma standards were found to guide all aspects of operations of a Czech producer of magnetic based products. Not only do they use standardized procedures and techniques to evaluate their suppliers, but they also use them on everything they do in order to optimize efficiencies in the information sharing process. Similarly, a Czech semiconductor manufacturer requires all suppliers to perform self-audits on a monthly and annual basis. Reactive problem solving and avoidance is part of the monthly audit process and takes place on an on-going basis. As a final example, a Hungarian division of a U.S.-based PC manufacturer was found to use on-site visits to discuss

process failures, successes, future needs, and what works and what does not work. The visits usually last a few hours and are believed to be a personal way to strengthen the alliance.

As expected, relationship management was found to be critically important with strategic suppliers – far more so than with other suppliers. Many companies reported that they will have annual “seminars,” “retreats,” or “get togethers” with all strategic suppliers. Not only does this allow them to discuss process issues and future product development, but it also helps to maintain personal relationships and build social bonds between companies. While personal relationships were not as important with the largest companies – where corporate policies limit how personal relationships can affect business processes – most hi-tech companies reported that with respect to critical components, relationships with suppliers were as important in the sourcing decision making process as factors such as price, quality and deliverability. This is not the case with lower-level commodities, where price, quality and deliverability are the primary (and generally only) concerns.

DISCUSSION

In today’s business-to-business markets there is intense pressure to improve the efficiency and effectiveness of both marketing and procurement efforts. Companies have increasingly adopted global sourcing strategies in support of their global business strategy. However, regardless of the extent of business globalization, global sourcing strategies are increasingly viewed as critical to realizing competitive advantage (Carter and Narasimhan 1996, Frear, Metcalf, and Alguire 1992). Until now a prime focus of globalization practice has been on the search for low-price suppliers and the past decades have seen a supply of those in the emerging economies. However, with the increasing emphasis on maximizing value in the value chain, global sourcing on price alone is becoming an unstable strategy. In countries with emerging economies,

development of suppliers and customers will be necessary before expected benefits can be generated for the value chain partners. (Lamming et al. 1999).

Our findings suggest that within the high-tech sectors in Eastern Europe there is very little commerce that is taking place electronically. Two main explanations for this were identified from the interview transcripts. This first suggests that electronic procurement systems do not make economic sense due to the nature of products purchased in the high-tech sectors (often low volume and highly specialized) and the relatively small markets served. A second suggests that electronic procurement and the efficiencies that come with these procedures are only valuable when the products and services being sourced are of adequate quality. Thus, for companies wanting to form supply relationships with Eastern European companies, helping these suppliers develop their quality and efficiency is taking priority. Interestingly, there seems to be a desire for multinationals to develop a supply base locally, and evidence suggests that they are helping these local suppliers become competent global suppliers. As the quality and operational efficiency of these local suppliers improves, it seems reasonable that procurement efficiencies will then become a source of competitiveness. Thus, a replication of this same study in the coming years may generate very different findings and e-procurement may be more prevalent; particularly among firms with large or global markets.

Future Research Directions

It is our hope that the qualitative research presented in this article will stimulate further research in the areas of electronic procurement, purchasing in high-tech industries, and the development of procurement practices in developing economies. The findings presented here are based on transcripts from a few carefully chosen interviews. Although several of the prescriptions presented by Johnston et al. (1999) on case methodology were followed, the

qualitative case studies were exploratory in nature and findings should be interpreted in light of this.

As with most qualitative studies, we found evidence that supports many of the established and evolving theories of buyer-seller relationships as well as a few more surprising insights. For example, the prevalence of the desire for local suppliers by global multinationals and the extent to which they were “developing” these suppliers is an interesting area deserving further research attention. The lack of interest in IT procurement systems among the firms interviewed was also surprising. An examination of attitudes toward IT and its ability to create a competitive advantage may be an interesting area of study. Our findings suggest that these attitudes may have large national differences; the European firms we interviewed seemed to have a more cautious and perhaps more realistic view of the benefits of information technology and e-procurement systems than American firms.

Likewise, although information technology and the capabilities they provide continue to be a critical driver for many organizational purchasing strategies, we still know very little about how these new technologies impact relationship formation and maintenance. For that matter, we know little about how geographic distance impacts upon them. Many of the European firms we interviewed were sourcing from Asia and the U.S. When choosing to do business with foreign suppliers electronically, how strong can relationships become? How is trust established and maintained? What kind of partnering relationships develop, and are these relationships valued by organizational buyers? Furthermore, is the nature of these relationships or their development the same for buyers in developing countries?

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Table 1: Interview Protocol

1. How is your choice of suppliers integrated into your organizational strategies and objectives? How do your relationships with suppliers impact your competitiveness? Are some suppliers more integrated than others? Why?
 2. What kind of strategic information do you share with your suppliers? To what extent do you share information on proprietary technology?
 3. What kind of products and services do you purchase electronically? When choosing to do business with suppliers electronically (Ex: electronic procurement, KanBen, electronic data interchange), how strong are those relationships? How is trust with suppliers established and maintained?
 4. Does your company utilize suppliers from foreign countries? Why or why not (Ex: reduce cost, increase quality, no choice, and enhance competitive position)?
 - a. Is there a difference in your relationships with foreign and domestic suppliers? What are these differences? Specifically, what are the differences in your relationships with domestic suppliers, foreign suppliers from European countries, and foreign suppliers from other parts of the world?
 - b. How important is knowledge of cultural business practices when dealing with a foreign supplier? Does lack of cultural knowledge (Ex: cultural norms, trade/government regulations) hinder the relationship?
 5. What are your future procurement goals?
-