Association for Information Systems
AIS Electronic Library (AISeL)

ICIS 1997 Proceedings

International Conference on Information Systems (ICIS)

December 1997

Selling in the Era of the "Net": Integration of Electronic Commerce in Small Firms

William Kettinger
University of South Carolina

Gary Hackbarth
University of South Carolina

SELLING IN THE ERA OF THE "NET": INTEGRATION OF ELECTRONIC COMMERCE IN SMALL FIRMS

William J. Kettinger
Gary Hackbarth
University of South Carolina

Abstract

This paper reports on a research study concerning the integration of electronic commerce (EC) into the pre-sales business processes of small firms. By means of a field survey, 17 small firms were examined at the end of their first year of participation in an EC network that matches procurement bids of large governmental and private sector buyers with small firm suppliers. Similar to past research models focusing on the integration of "post-sales" electronic commerce technologies such as EDI, this study found that the factors of perceived benefits and organizational readiness to adopt EC technology influence the pre-sales integration of EC in small firms. An additional factor, characterized as "trust and cooperation," was also associated with pre-sales EC integration. Unlike past research on the post-sales EC in small firms, external pressure due to customer coercion was not found to heavily influence pre-sales EC. In addition to presenting a refined adoption and integration model to support further research on pre-sales EC technology integration, the customer-supplier life cycle framework is introduced as a managerial tool to identify integration opportunities and evaluate a firm's EC value chain.

1. INTRODUCTION

Business opportunities in electronic commerce (EC) are burgeoning around the globe because of the proliferation of telecommunication technologies and a belief that information systems will allow firms to more efficiently match customers and suppliers. The Internet and associated technologies allow customers and suppliers to interact in near real-time, suggesting that relationships are being established to adapt business processes to a new paradigm where customers and suppliers actively seek each other out (pre-sales) and consummate the business transaction (post-sales) entirely by electronic means. This new paradigm requires a research model that distinguishes EC integration in terms of these spontaneous buyer and supplier transactions.

Extensive research has focused on the benefits and opportunities firms can leverage by using post-sales technologies to transmit commercial documents electronically (Jelassi and Figon 1994; Senn 1992). Interestingly, while the adoption of post-sales EC is often treated in the literature as a coercive response to large customers' demands, pre-sales EC technologies may be used as a practical means for a small firm to identify new customers and share information that may make them more competitive in an electronic marketplace. Unfortunately, many small firms have not used pre-sales EC technology to any large extent because they lacked the technical knowledge, the financial resources to purchase technology and training, and an understanding of how the technology could be applied. With the establishment of the South Carolina Business Gateway (SCBG) in April 1995, the researchers were afforded an opportunity to investigate the post-adoption integration of EC in a group of small firms. The SCBG is designed to help small firms increase and expand their business opportunities by providing computer-to-computer access and product-bid matching. This value-added network assisted these small firms by identifying government and private sector procurement bids for goods and services and then linking them with the buyer. Thus, this study addresses the question: Which factors influence the integration of EC in the pre-sales business processes of small firms?

2. RESEARCH MODEL AND PROPOSITIONS

2.1 Background

An electronic marketplace (or electronic market system) is an interorganizational system that allows participating buyers and sellers to exchange information about prices and product offerings (Bakos 1991). Malone et al. (1987) suggest two broad categories or mechanisms for coordinating the flow of goods and services: markets and hierarchies. Markets coordinate the flow of goods and services through supply and demand forces. The buyer of a good or service compares many possible sources and then makes a selection with the best combination of design, price, quantity, and delivery schedule. Unlike hierarchies which coordinate the flow of goods and services through a managerial hierarchy, electronic markets allow customers and suppliers to seek each other out (pre-sales) and conclude a transaction electronically (post-sales) to the optimum benefit of both parties.

Economic theory provides insights into the benefits of electronic marketplaces, what options are available to the parties involved and how EC technology might be utilized. Clemons and Row (1992) argue that recent advances in computing and communications technology affect the costs of coordination and that they have had a dramatic impact on the risks associated with inter-firm coordination. The reduction of searching, communication and labor costs provide incentives for firms to outsource and opportunities for small firms to leverage their expertise. Transaction cost economics suggests that the degree of outsourcing and choice of technologies that govern transactions are a dichotomy between markets and hierarchies. The market, consisting of many independent suppliers, can frequently provide a product or service at a higher quality and lower price because suppliers may possess a degree of specialization missing in large firms. For example, the auto industry uses qualified suppliers to provide key components to assembly lines to guarantee quality, reduce inventory and continually focus supplier research and development on specific components.

Previous research suggested that markets lead to lower production costs and higher coordination costs (Malone et al. 1987). Advances in telecommunication technology have changed this relationship. In many Internet-based businesses, IT helps to lower coordination costs while keeping production costs low (Bakos 1993; Clemons et al. 1993; Clemons and Row 1992). IT also reduces searching costs for buyers and suppliers in an electronic market. Pre-sale searching costs include the costs a firm expends to locate, contract with and communicate business information to other firms. Reductions in transaction costs equate to lower overall total costs. This allows supplier firms to compete at a lower price and often forces large firms to out-source inefficient products and services, thus creating business opportunities for small firms. Supplier firms who can reduce coordination costs and leverage their expertise can now compete on more equal terms with like firms as well as provide the customer an alternative supplier.

Focusing on coordination costs alone, however, gives an incomplete picture as to why buyers would seek out a market relationship with suppliers. The advent of the "net" has brought about new collaborative organizational forms such as value adding partnerships. For example, there is evidence that smaller, tighter networks of suppliers often enjoy non-contractible benefits such as innovation, quality, information exchange, trust, flexibility, and responsiveness (Bakos and Brynjolfsson 1993). Thus, the literature suggests that competitive opportunities exist for small firms in the era of EC if they recognize the benefits and can effectively identify, win, and nurture buyer-seller relationships. After weighing the relative advantages and disadvantages of EC, a small firm will make the decision to adopt EC and, over time, integrate the necessary business practices and technology to take advantage of an electronic network (Press 1996). Secondly, to the extent that small firms can leverage their limited resources with other small firms via cooperative network connections, they may achieve economies of scale and create new sales opportunities that were not available prior to EC.

2.2 The Customer Supplier Life Cycle (CSLC)

The customer resource life cycle (CRLC) is an opportunity framework that allows managers of supplier firms to take the customer's viewpoint in an effort to provide better service and identify business opportunities (Ives and Learmonth 1984). Runge (1988) later adapted the CRLS into an information technology-fitting framework that analyzed telecommunications-based information system links to customers. It is suggested that this framework be used in a specific sequence of steps that look at a customer's interactions with the supplier firm. While useful, this perspective does not adequately address the relationships between customers and suppliers. It is useful to point out that the CRLC was derived in part from the four stages of the IBM Business System's Planning process that evaluated the supporting resources a firm needs to accomplish its objectives (IBM 1981). Thus, we are in a sense coming full circle by recognizing that the customer-supplier relationship is not independent but interdependent. The proposed "*customer and supplier life cycle*" (CSLC) combines both the supplier and customer viewpoints to explain how EC transactions take place in an electronic market.

In the past, MIS literature has focused on post-sales EC technologies like EDI (Hansen and Hill 1989; Iacovou et al. 1995; Jelassi and Figon 1994). Today, interdependent customers and suppliers rely on pre-sales EC communication technology to find each other and efficiently complete business transactions. By adding a supplier side to the CRLC, customer-supplier viewpoints can be compared and contrasted along a continuum of transactional events in order to gain a more complete perspective of the linkages necessary to successfully exploit EC technologies. The CSLC also demonstrates how linkages between typical buyers and suppliers interrelate and are generic to all procurement relationships, not just electronic linkages required for EC integration. Figure 1 is a graphical representation of the CSLC framework; the shaded portion represents the pre-sales component of the model.

The pre-sale EC side of the CSLC proposes that suppliers be able to identify, evaluate, and respond to customer requests. Concurrently, customers are searching for product/service information with the intent of specifying requirements, selecting a supplier, and ultimately ordering a product or service. The post-sale EC portion of the CSLC includes the delivery, acceptance, and transfer of funds once the customer has acquired the product or service. It is important to note that, even though both the supplier and customer can evaluate the business transaction at its completion, it is likely that the evaluation procedure is an on-going process. For instance, if the supplier cannot meet the requirements of a customer, no product or service can be delivered. Thus, a supplier may wish to reconsider the appropriateness of its product and/or service capabilities in order to induce the customer to buy their product or service. Alternatively, if the customer cannot locate a suitable supplier, the customer may wish to reconsider its purchase requirements or continue to scan the marketplace for a more suitable supplier. It is the significance of the customer successfully ordering the product or service from the supplier that separates pre-sales and post-sales EC.

The integration of electronic commerce technology is the process during which a firm becomes technologically and organizationally capable of transacting electronic commerce and over time integrates EC into its business processes. Table 1 describes opportunity points within the CSLC to improve links between customers and suppliers. Although adoption and integration of electronic commerce technologies can happen at the same time, they usually do not. Integration typically takes place over time and to varying degrees in different business processes. Small firms must internally integrate a variety of applications (e.g. browsers, e-mail) into their business pre-sales processes before they can actively integrate externally with customers, suppliers, government agencies and financial institutions. Therefore, time is a necessary requirement for small firms wanting to exploit EC business opportunities.

> **Proposition One:** Small firms will integrate EC into their pre-sales business processes over time and at different rates.

Table 1. Steps in the Customer–Supplier Life Cycle (CSLC)

STEPS IN THE CSLC (Pre/Post Sales Activities)	EXPLANATION
1. Identify and Advertise for Potential Customers	Suppliers identify prospective customers and then target advertising to stimulate information requests.
2. Scan and Acquire Product/Service Information	Customers acquire information about the product or service desired.
3. Specify Requirements of the Product/ Service to be Purchased	The customer specifies the attributes of the required product or service to the supplier.
4. Evaluate Customer Requirements and Capabilities to Respond	The supplier evaluates the customer's product requirements, service requests or pricing limitations.
5. Prepare and respond to Customer Request	If there is a successful match between a customer request and a supplier capability, a formal response to the customer is formulated, approved by management, and sent back to the potential buyer. If a firm determines that they cannot meet the customer's requirements, they can respond back to the customers with appropriate recommendations and then return to scanning the marketplace. Firms review geographic scope, profit margins, service issues, task difficulties, product modifications, etc. before approving and submitting an offer back to a customer.
6. Select a Supplier	Customers select a source based upon their own criteria and award a contract.
7. Order the Product/Service	After a contract is awarded, the buyer sends an order request, then waits for the product or service to be delivered from the supplier.
8. Deliver the Product/Service	The supplier determines an appropriate mode of transportation for delivery of their product or service.
9. Acquire the Product/Service	Customers receive the product or service.
10. Authorize and Pay for the Product/Service	Customers authorize the transfer of funds to the supplier or directly to the supplier's bank.
11. Receive Payment	The supplier or suppliers financial institution receives payment.
12. Evaluate Process and make Changes	Suppliers use information gained from successful sales to refine and improve contract proposals.
13. Evaluate the Process and Make Changes	Customers use the information gained from successful purchases to better select suppliers and transaction systems.

2.3 The Electronic Commerce Network Model

Iacovou et al. introduced a three-factor model that predicted EDI adoption and integration in small firms. The primary focus of their study was on post-sales uses of EDI (EDI is an EC technology typically used after customers and suppliers locate each other). The current study proposes to extend this model to include pre-sales uses of EC technology. Thus, three major factors influence the adoption and integration of EC practices in small firms. These factors are *organizational readiness* (IT sophistication and financial readiness), *external pressures to adopt and integrate* (imposition of customers and desire to keep ahead of competitors), and *perceived benefits* (desire to improve the customer base and increase internal efficiencies). In addition, it is proposed here that a fourth factor,

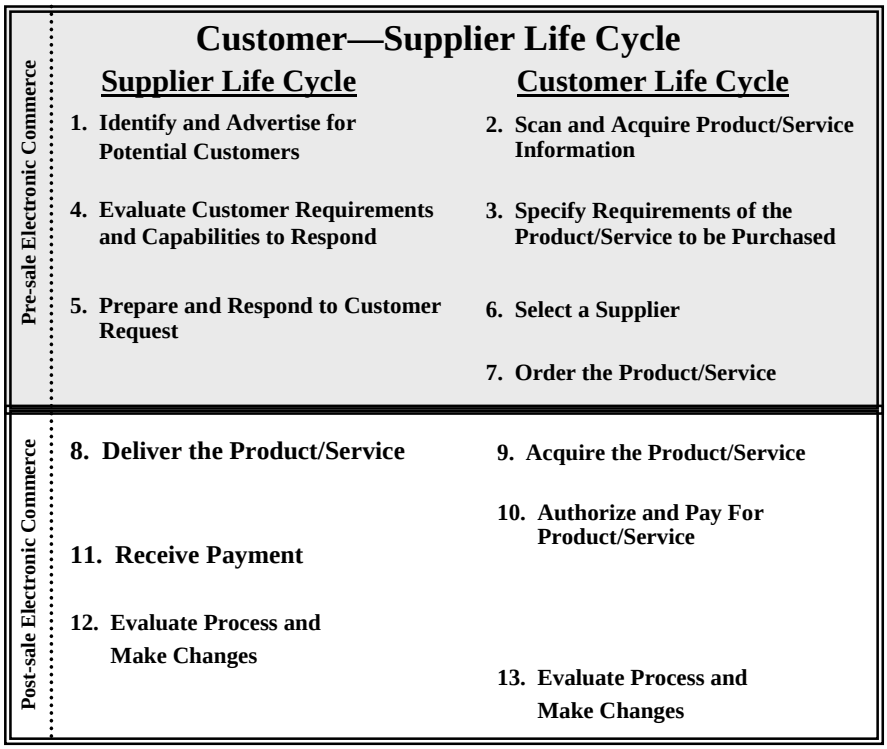

Figure 1. Customer—Supplier Life Cycle (CSLC)

trust and cooperation (the need for small firms to share information) be recognized as an important factor impacting EC integration in small firms. Firms adopt EC with the expectation that there will be a positive impact on their individual business situation. The results of the EC integration process may be successful or fail. The electronic commerce network model is as shown in Figure 2.

Perceived benefits to small firms are the extent to which small firms perceive that there are benefits to be derived from participating in an electronic network. Benefits will help determine whether they join the network and, ultimately whether they proceed to integrate its use into their business processes. Perceived benefits may include the ability to identify new customers; identifying partners for cooperative sourcing and bidding; the ability to improve trading partner relationships; an increase in operational efficiency; reduced inventory costs; improved cash flows; and better customer service. Small firms receiving external information concerning the benefits of EC will be more likely to perceive business opportunities.

> **Proposition Two**: Small firms perceiving benefits from EC technologies will be more likely to adopt and integrate EC into their pre-sales business processes.

Organizational readiness of small firms refers to the level of (1) financial and (2) technological resources of the firm. Small firms do not typically have the necessary financial assets available for investments in electronic networks. Installation costs, implementation of any subsequent enhancements, communication charges, usage fees, etc., can become more extensive than originally planned, adversely affecting the financial stability of the firm. Low levels of computer sophistication coupled with limited requirements to automate business processes makes transition to a

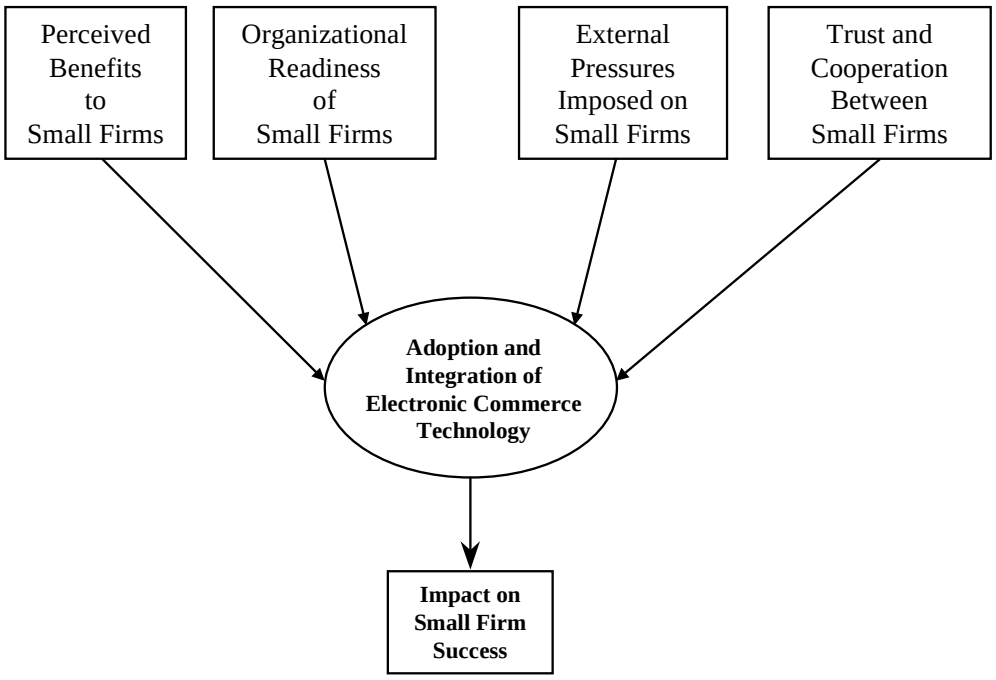

Figure 2. Electronic Commerce Network Model

higher level of sophistication difficult and costly for small firms wanting to join a virtual network. Small firms with a high degree of computer sophistication are less intimidated by technology, understand better how to leverage information technology, and have access to technological resources. By providing technological and financial assistance to small firms, these hurdles can be overcome.

> **Proposition Three**: Small firms with higher organizational readiness are more likely to adopt and integrate EC into their pre-sales business processes.

External pressures imposed on small firms refers to the influences from the organizational environment. The two main sources of pressure to adopt network technologies come from pressures from competitors and/or impositions by trading partners. As more firms within an industry adopt EC technologies, firms will require EC technology as a strategic necessity to stay competitive. Imposition from trading partners is an important factor because weaker partners in interorganizational relationships are susceptible to impositions by larger trading partners. The coercive tactics exercised by trading partners is a function of the potential power of the imposing partner and its chosen influence strategy. A powerful customer may recommend, make promises, or threaten a small firm to encourage them: who to buy from, who to sell to, how trades will be conducted, and whether they should participate in an electronic network. By banding together in an electronic network, small firms can moderate these effects and improve their bargaining position.

> **Proposition Four**: Small firms experiencing competitive pressure and/or an imposition by trading partners will be more likely to adopt and integrate EC into their pre-sales business processes.

Trust and cooperation between small firms refers to the ability of small firms to benefit from the participation of other small firms in a network of small firms (Chiles and McMackin 1996; Clemons and Row 1992). This benefit may be based on a sense of geographic community/culture or it may be defined by interest in a common industry's

survival and vitality. This sense of community helps explain behavior of network participants that counters short-term market expediency for long-term communal benefit; often, cooperative partners will continue to share information or transact business even when a product or service could be purchased elsewhere at a lower price. These small differences in price are overlooked to stabilize the local value chain, protect a particular product expertise, and to preserve loyalty among members of the same EC network. Over time, this relationship builds a sense of trust or partnership among network members.

> **Proposition Five**: Small firms able to trust and cooperate with other small firms and network participants will be more likely to adopt and integrate EC into their pre-sales business processes.

The model indicates that after successful integration of electronic commerce technologies, small firms will begin to feel the impact of participation in an electronic marketplace. *Impact on small firm success* refers to the actual benefits small firms receive after adopting the technologies that allow them to participate in electronic commerce networks. The more a firm integrates into the network, the greater the potential benefits.

3. RESEARCH METHODOLOGY

3.1 Sample Selection and Instrument Development

An empirical and qualitative study of 17 small firms belonging to the SCBG was undertaken during the summer and fall of 1996 to evaluate the pre-sales integration of EC technologies. The survey instrument of Iacovou et al. was modified to develop a protocol that conformed to the CSLC (Figure 1). It was designed with indicators capable of measuring pre-sales adoption and integration factors (integration dependent variable) as well as the four factors (independent variables) influencing integration as outlined in the EC network model (Figure 2). Field surveys were pre-tested on three SCBG firms and modifications were made. To ensure that the study was including only small firms, firm selections were controlled on number of employees (no greater than 150). Table 2 is a description of the small firms included in the study sample. All of the study firms received some technical assistance, and discounted access to the Internet and were subscribers to the SCBG computer bid matching services. By joining the SCBG, sample firms made the decision to adopt EC technology.

3.2 Data Collection

The primary data collection method was face-to-face interviews with the owners or designated representatives of SCBG firms using the derived survey protocol. However, telephone interviews were conducted when face-to-face meetings could not be arranged and for follow-up questions and probes. All respondents were directly involved with the SCBG and had the confidence of the firm to make decisions regarding EC transactions. All interviews were tape recorded, and all sessions were transcribed before the data were analyzed. To ensure consistency and reliability, the interview protocol guide was used for all interviews. The interview guide included a number of open-ended questions to allow the participants flexibility in their answers.

3.3 Data Analysis

The concepts, constructs and variables measured are described in Table 3. Using the protocol developed, each firm's relative degree of integration was assessed. This was accomplished whereby one researcher scored each firm based on the written narrative. Based on the interview protocol, each firm was scored on each question as being high, medium, or low. A second researcher examined the results to validate the first characterization. A third, and final, judgement, was made to justify and establish a respondent's values.

Table 2. Organizational Descriptions

Firm Name	Geographic Operations	Number of Employees	Average Number of Matches/Month	Percent of Business Due to Single Customer
Printing firm A	Statewide	4	105	50%
Printing firm B	National	70	32	25%
Advertising firm A	National	4	5	25%
Advertising firm B	National	7	10	25%
Systems Integration A	National	8	3	75%
Systems Integration B	National	1	40	15%
Systems Integration C	National	10	162	10%
Systems Integration D	International	14	195	60%
Construction firm A	Statewide	10	30	75%
Construction firm B	Statewide	50	20	75%
Construction firm C	Statewide	2	35	75%
Manufacturing firm A	Tri-county	23	6	75%
Manufacturing firm B	State-wide	21	104	25%
Manufacturing firm C	National	5	16	5%
Government Contracting firm	National	125	130	75%
Drug Testing firm	National	3	1	5%
Air Testing firm	International	1	19	50%

To distinguish between high, medium, and low integration responses for each of the pre-sales stages of the CSLC, a score was established for each stage of the CSLC and then a ranked score for each firm was calculated (high = 3, medium = 2, low = 1). The firms were then rank ordered. Similar calculations were made for the independent variables of the electronic commerce network model. Table 4 shows the aggregate results for the integration dependent variable by pre-sale step and ranked score. Table 5 presents the results of the measures of the independent variables compared with the six highest and lowest EC integrators.

4. RESULTS

4.1 Integration

Proposition One: As proposed, it was found that small firms integrate EC into their pre-sales business processes at different rates. In addition, within integrating firms, the extent of integration differed by pre-sales business process. The more successful firms actively sought and leveraged information gleaned from computer bids and informational requests to improve their competitive position. Pre-sales EC integration for supplier firms, as outlined in the CSLC, consists of four discrete steps. The results for each step are discussed below, including examples from selected firms.

Identify and Advertise for Potential Customers. High integrating firms sought business opportunities outside of state and regional boundaries. For example, the Drug-Testing Firm, while remaining small, was able to locate and coordinate similar firms around the country able to conduct drug testing. Printing Firm B was actively trying to expand their business, while using the SCBG network to establish an electronic presence and show the world that South Carolina printing firms were state-of-the-art.

Table 3. Concepts, Constructs, and Variables

Concept	Construct	Variables
EC Adoption and Integration	Integration	Identify & Advertise for Potential Customers (CSLC) Evaluate Customer Requirements & Capabilities to Respond (CSLC) Prepare & Respond to Customer Requests (CSLC) Evaluate Process and Make Changes (CSLC)
Perceived Benefits	Sales Benefits	Searching Costs Communication Costs
	Operational Benefits	Labor Costs Operational Efficiencies Information Quality
	Customer Benefits	Customer Service
Organizational Readiness of Small Firms	Financial Readiness	Slack Resources
	Technological Readiness	IT Sophistication Platform Availability
External Pressures Imposed on Small Firms	External Imposition	Customer Power Competitor Power
Trust and Cooperation between Small Firms	Sense of Community	Geographic Focus Cultural Focus
	Short-term Expediency	Long-tern View Toward Customers Long-tern View Toward Competitors
	Trust or Partnership	Welfare of the Network
	Cooperativeness	Togetherness

Low integrating firms tended to not expend resources scanning for new customers. Rather, there was a tendency to focus on local customers with an expectation that customers would seek them out. For example, Advertising Firm A became disillusioned with the SCBG network when the number of computer bids received did not match pre-perceived results based on their bid-matching profile. Printing Firm B felt large firms prevented them from competitively bidding on small contracts and that many of the computer bids being received were too large, both in dollar amount and volume of materials, for them handle.

Evaluate Customer Requirements and Capabilities to Respond. High scoring firms frequently checked their e-mail for business opportunities (computer bid matches) and sought to leverage information to benefit the firm. Evaluation of pricing, contract boilerplate, success of past bidders, possibility of new products, and services were all examined to make the firm more competitive in its response. For example, Construction Firm A said of the EC information received, "We are getting much more information earlier than before without having to call around. The information is excellent, the request for proposals (RFPs) usually have acreage, price range, location, length of road, and where to get more information." The Government Contracting Firm and Printing Firm B both instituted formal processes where the business owners and key staff evaluated bids based on geographical location, date of delivery, internal capabilities, and whether or not the undertaking fit into their production schedules. Printing Firm B periodically low-

Table 4. Integration Results

	Customer-Supplier Life Cycle Pre-Sales Steps				
Company	**Identify and Advertise for Potential Customers**	**Evaluate Customer Requirements and Capabilities to Respond**	**Prepare and Respond to Customer Requests**	**Evaluate Process and Make Changes**	**Ranked Score**
Construction Firm B	L	L	L	L	4.83
Advertising Firm B	L	M	L	L	5.00
Printing Firm A	L	M	L	L	5.50
Manufacturing Firm C	L	L	L	M	5.67
Manufacturing Firm A	L	M	L	M	6.00
Computer Consulting Firm A	L	L	L	M	6.17
Computer Consulting Firm C	M	M	L	H	7.50
Computer Consulting Firm B	H	M	M	L	7.67
Construction Firm A	M	L	M	L	7.83
Construction Firm C	M	H	M	M	8.00
Air Testing Firm	H	M	L	H	8.33
Manufacturing Firm B	H	H	M	M	8.50
Computer Consulting Firm C	L	M	L	H	8.50
Government Contracting Firm	H	H	L	M	8.67
Advertising Firm A	H	H	M	L	9.00
Drug Testing Firm	H	H	M	H	10.17
Printing Firm B	H	H	H	H	11.17

Note 1: H (3) = High Scoring Firms, M (2) = Medium Scoring Firms and L (1) = Low Scoring Firms

bid contracts "to keep people working and the presses moving." An ulterior motive for this strategy is that customer firms perceive them helping out on the tough jobs and call them directly on more lucrative contracts.

Low scoring firms did not evaluate their computer bid matching e-mail frequently nor did they use their access to the Internet to request winning bid information or identify additional products or services that could meet customer requirements. Advertising Firm B, for example, never asked for winning bid information or sought to leverage the basic information being received within the computer bid matches.

Prepare and Respond to Customer Requests. SCBG consolidates federal, state and local government and private sector RFPs/RFQs into an electronic format and distributes this information by e-mail to subscribers based on profiled keywords. The number of firms able to prepare and respond to customer requests from computer bid matching was a surprise. The least successful small firms were often unable to prepare a "winable" governmental request proposal even if they knew of a selling opportunity.

A high scoring firm like the Government Contracting Firm, while not making a bid proposal, was in the process of converting to an all electronic bid searching application enroute to becoming a paperless office. Manufacturing Firm C also did not make a bid but was being contacted by the U.S. Navy because of their status as a woman-owed business after they requested membership in the SCBG. The Drug Testing Firm bid on a U.S. Postal contract. While they did not win, they were one of seven firms nationally to meet the Post Office Drug Screening qualifications and thus had firms calling them, wanting to do business in order to qualify themselves as postal carriers.

Table 5. Result of Analysis of Factors on EC Integration

	Electronic Commerce Network Model Factors			
Company	**Perceived Benefits**	**Organizational Readiness**	**External Pressure**	**Trust and Cooperation**
LOW INTEGRATORS				
Construction Firm B	L	L	L	L
Advertising Firm A	L	L	L	L
Printing Firm A	L	M	M	L
Manufacturing Firm C	L	L	H	H
Manufacturing Firm D	L	L	L	L
Computer Consulting Firm D	M	H	H	L
HIGH INTEGRATORS				
Manufacturing Firm B	H	H	H	H
Computer Consulting Firm A	M	H	H	H
Government Contracting Firm	M	H	L	H
Advertising Firm B	H	M	H	L
Drug Testing Firm	H	L	L	H
Printing Firm B	H	L	M	H

Note 1: H (3) = High Scoring Firms, M (2) = Medium Scoring Firms and L (1) = Low Scoring Firms
Note 2: Shaded portion indicates highest integrating firms, No shade indicates lowest integrating firms

Evaluate Process and Make Changes. Low scoring firms typically had not updated their computer bid matching profiles after the initial setup nor were they interested in additional EC technologies offered by the SCBG like WWW home pages and EDI services. They also focused in on the numbers of bids or contracts made. High scoring firms changed and evaluated their business profiles at least once and were receptive to additional EC services. Computer Consulting Firm A changed their profile every few months in an effort to decrease the number of extraneous bids being received and focus in on more specific services supportable by their firm. They also had established a WWW home page.

4.2 Factors Leading to Integration

The analysis of the relationship between the factors of the EC network model and the degree of pre-sales integration indicate some interesting findings. Table 5 indicates the relative relationship of pre-sale factors for the six highest and lowest ranked integrators. The middle five firms as ranked by the degree of EC integration were excluded from further analysis to help clarify differences between low and high firms.

In general, the perceived benefits, trust and cooperation, organizational readiness, and external pressure perceived by the small firm distinguish differing levels of pre-sales electronic commerce integration. Perceived benefits and increased trust and cooperation between business partners influence successful integration the most. Organizational readiness, while not as strong an indicator of integration, seems to differentiate low integrators. External pressure is the least important of the indicators and may indicate a willingness to adopt new technologies rather than integrating technologies.

Proposition Two: Perceived benefits seem to be a strong indicator of integration. Low scoring firms tended to focus on the numbers or lack of numbers of contracts won. In contrast, high scoring firms leveraged EC informational benefits by developing new business contacts, increasing their visibility in the business community, seeking pricing and contractual information, and acquiring additional EC technology. The Air Testing Firm and Computer Consulting Firm A advertised their services on WWW home pages. The Government Contracting Firm and Printing Firm B emphasized the importance of the SCBG to prospective clients and emphasized the fact that the SCBG home page was on the South Carolina Governor's WWW site as an important business resource. High integrators generally thought that EC technology would streamline orders, increase customer service, provide EC educational training and increase the number of political connections.

Proposition Three: Trust and cooperation seems to be another important factor in the integration of EC pre-sales technologies. There were indications that some firms were forming partnerships and alliances to better compete in the marketplace. The Drug Testing Firm formed a partnership with a firm carrying related products in order to provide a fuller range of healthcare services to clients. Manufacturing Firm B routinely shared information with similar distributor firms to counter manufacturers selling direct to their customer base. They were also a charter member of "Purchase Link," which is an assemblage of nine commodities dealers electronically linked between themselves and their product manufacturers. They intend to be a one stop electronic ordering system for large companies needing expendables. Smaller printing firms sought Printing Firm B's expertise in government contracting and acted as intermediaries in referring customers when they lacked the capability to meet customer requirements themselves.

Proposition Four: It was found that organizational readiness did not always predict pre-sales integration. Three of the six high integrators required additional hardware or technical assistance in establishing connectivity with the SCBG. They were aware of their limitations and sought assistance. For instance, Printing Firm B upgraded the electrical system in their building and bought additional PC hardware. Low integrators had expertise but indicated they would have not purchased similar services from another provider prior to joining the SCBG. High integrators had or were interested in having a WWW home page. The low adopters wanted to know if it was going to work before they invested any resources. This suggests that subsidies maybe a major motivator in adopting the technology.

Proposition Five: External pressure proved the weakest of the factors influencing integration. Evidence seems to suggest that this factor may influence adoption more than integration and may play a greater role in post-sales EC in small firms. When asked if competitive pressure or imposition by trading partners influenced their decision to participate in an electronic network, sample firms generally replied in the negative. However, further questioning revealed that several firms had established EDI links with major customers: Printing Firm B, Manufacturing Firm B, and the Drug Testing Firm. Manufacturing Firm B was told by one of the largest textile companies, their largest trading partner, to establish EDI connections or lose their business. Several small firms perceived themselves as 'early movers' in gaining a competitive advantage over their competitors. These early results suggest that competitive rather than coercive tactics play a larger role in EC integration in pre-sales processes of small firms.

5. DISCUSSION OF RESULTS

The electronic commerce network model identifies those firms willing to adopt and integrate EC into their pre-sales business processes. This study found that the factors of perceived benefits and organizational readiness to adopt EC technology influenced the pre-sales integration of EC in small firms. An additional factor, characterized as "trust and cooperation," was also determined to impact pre-sales EC integration. Unlike past research on the post-sales EC in small firms, external pressure due to customer coercion was not found to heavily influence pre-sales EC for most firms studied.

The proposed CSLC can help explain the interdependency between customers and suppliers by allowing each to look up and down their value chain for better opportunities to serve their business partners. The results of this study suggest that high integrators of EC technology tend to "identify and advertise for potential customers" as well as "evaluate customer requirements and capabilities to respond" better than low integrators. Low integrators seem to do a poorer job of "preparing and responding to customer requests." Finally, there is some support for suggesting that high integrators do a better job of "evaluating processes and making changes" than low integrators.

Our results are generally consistent with the findings of Iacovou et al. (1995). Low integrators focused on efficiencies and high integrators were more strategic in focus, identifying indirect benefits such as presence, new business relationships, and the ability to scan new and remote markets. While not implicitly used in the model, number of employees did not seem to influence integration nor were industry factors related to integration. The most significant difference from the Iacovou, et al (1995) EDI adoption model is the seemingly important influence of trust and cooperation and the apparent limited effect of customer coercion on pre-sales EC integration.

6. IMPLICATION FOR PRACTICE

This study looked at firms using EC technology for the first time after one year of experience. To a large extent their results were positive. While the number of actual contracts awarded through the SCBG network was less than expected, the real benefits were information quality and exposure to EC. The most successful of the sampled firms were able to scan the marketplace for business opportunities and locate additional business opportunities with similar firms or in complimentary industries.

In general, it was found that small firms can successfully adopt and integrate EC into the pre-sales processes of their firms to scan for customers. Success is not obtained without effort, planning, or an understanding of EC. Opportunities exist with proper procurement training and technological sophistication. Business opportunities are sometimes indirect and must be drawn out through a careful assessment of RFQs/RFPs and winning bid results. Firms must not expect to sign-up for services, write a profile, and then sit back and watch business roll in. Computer bid matching profiles require management, customers need to be called, and firms need to learn how to correctly write and submit government bids. Interfirm cooperation is possible and may lead to successful bidding. And most importantly, integration of EC is a long-term commitment and may not show immediate bottom-line impacts.

7. REFERENCES

Bakos, B. "Information Technology, Incentives and the Optimal Number of Suppliers," *Journal of Management Information Systems,* Fall 1993, pp. 24-45.

Bakos, J. Y. "A Strategic Analysis of Electronic Marketplaces," *MIS Quarterly* (15:3), 3, 1991, pp. 295-310.

Bakos, J. Y., and Brynjolfsson, E. "Information Technology, Incentives, and the Optimal Number of Suppliers," *Journal of Management Information Systems*, (10:2), 1993, pp. 37-53.

Chiles, T. H., and McMackin, J. F. "Integrating Variable Risk Preferences, Trust, and Transaction Cost Economics," *Academy of Management Review* (21:1), 1996, pp. 73-99.

Clemons, E. K.; Reddi, S. P.; and Row, M. C. "The Impact of Information Technology on the Organization of Economic Activity: The 'Move to the Middle' Hypothesis," *Journal of Management Information Systems*, (10:2), 1993, pp. 9-35.

Clemons, E. K., and Row, M. C. "Information Technology and Industrial Cooperation: The Changing Economics of Coordination and Ownership," *Journal of Management Information Systems,* (9:2), 1992, pp. 9-28.

Hansen, J. V., and Hill, N. C. "Control and Audit of Electronic Data Interchange," *MIS Quarterly* (13:4), 1989, pp. 403-413.

Iacovou, C. L.; Benbasat, I.; and Dexter, A. S. "Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology," *MIS Quarterly* (19:4), 1995, pp. 465-485.

IBM. "Business Systems Planning: Information Systems Planning Guide," GE-20-0527-3, IBM Corporation, Armonk, NY, July 1981.

Ives, B., and Learmonth, G. P. "The Information System as a Competitive Weapon," *Communications of the ACM* (27:12), 1984, pp. 1193-1201.

Jelassi, T., and Figon, O. "Competing Through EDI at Brun Passot: Achievements in France and Ambitions for the Single European Market," *MIS Quarterly* (18:4), 1994, pp. 337-352.

Malone, T. W.; Yates, J.; and Benjamin, I. "Electronic Markets and Electronic Hierarchies," *Communications of the ACM* (30:6), 1987, pp. 484-497.

Press, L. "The Role of Computer Networks in Development," *Communications of the ACM* (39:2), 1996, pp. 23-30.

Runge, D. A. *Winning with Telecommunication*, The International Center of Information Technology (ICIT), Washington, DC, 1988.

Senn, J. A. "Electronic Interchange: The Elements of Implementation," *Information Systems Management*, Winter 1992, pp. 46-53.