MEASURING THE EFFECT OF THE DEPARTMENT OF DEFENSE CONTRACTING PROCESS REQUIREMENT OF ELECTRONIC DATA INTERCHANGE ON THE DECISION TO BID PROCESS OF SMALL TO MEDIUM SIZED FIRMS IN OKLAHOMA

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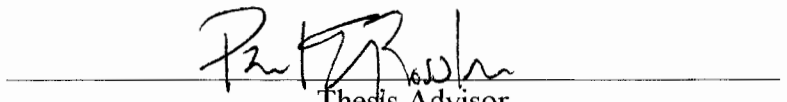

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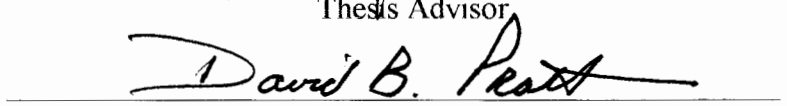

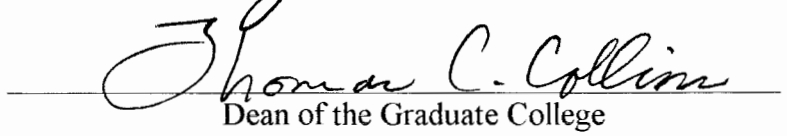

Dean of the Graduate College

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CHAPTER 1

THE PROBLEM AND ITS SETTING

Introduction

Electronic Data Interchange or EDI is a major part of a new wave of business transactions called Electronic Commerce or EC. EDI is the digital exchange of business information such as purchase orders, receipts, invoices, and payments between companies or trading partners using one or more standards that have been developed recently. EDI simplifies the flow of information from one point to the next by utilizing the advances in computer technologies to speed up information transfers thus saving a company time and money. However, since there is not one universal standard for information transfer, and since many small companies are leery of incurring the costs associated with learning EDI processes, only the largest companies in the United States are fully EDI capable. These large companies, called hubs, do a considerable amount of vendor business with many smaller companies. The hubs are now pressuring the smaller companies to become EDI capable since the cost benefits to the larger companies are potentially enormous. Paperwork done manually tends to be both time and cost intensive. Digital exchange of information can be integrated into already existing company databases which cuts down on the amount of time needed to key information into the computer systems.

Not only have the large hub companies jumped onto the EDI bandwagon but on October 26, 1993, President Clinton handed down an Electronic Commerce Initiative

designed to cut costs in the federal government procurement system. The federal government spends upwards of $200 billion annually buying goods and services from U.S. companies. Since 90% of all U.S. businesses are classified as small the government needs to maintain good business relationships with these potential supplier companies[19]. President Clinton wrote in his Electronic Commerce Initiative:

> "Moving to an electronic commerce system to simplify and streamline the purchasing process will promote customer service and cost-effectiveness. The electronic exchange of acquisition information between the private sector and the Federal government also will increase competition by improving access to Federal contracting opportunities for the more than 300,000 vendors currently doing business with the Government, particularly small businesses, as well as many other vendors who find access to bidding opportunities difficult under the current system. For these reasons, I am committed to fundamentally altering and improving the way the Federal Government buys goods and services by ensuring that electronic commerce is implemented for appropriate Federal purchases as quickly as possible."

The Department of Defense has been directed to implement EDI as the fundamental tool for conducting its procurement business. This department has established a goal of eighty percent full operating capability during 1995[19].

The Department of Defense has conducted a survey of its small business suppliers which shows that, "...small business is lagging behind in EDI solicitation (participation) in the industrial sector" [19]. Since the Department of Defense has initiated the implementation of EDI it has also taken a strong interest in helping potential small business suppliers learn about and use EDI and to gain an interest in replying to government contracting opportunities. The DoD has learned through its survey of its small business suppliers that,

"The relatively high costs of EDI software and the absence of formal information, education, and training are believed to be major factors which hinder small business participation" [19].

Statement of the Problem

The purpose of this research study is to define a model and develop a related survey instrument which studies the effects of the Department of Defense contracting process requirement of EDI on the decision making process of a small to medium-sized company (1-500 employees)[6] in Oklahoma to participate in the placing of an electronic bid on a Department of Defense contract.

Firms face three different broad issues when considering implementation of EDI: 1.) the strategic issues internal to the company structure which lead to the ultimate decision to make a strategic commitment to EDI technology, 2.) the technical implementation and feasibility issues such as software, standards, technical drawing packages[4],Value Added Networks, transaction maps, segment terminators, and element separators and headers [38], and 3.) the financial issues and costs associated with education, training (large learning curves), and implementation management which are estimated to constitute 90% of EDI implementation costs [41].

Each of these three issues, strategy, technology, and financing are major components in understanding how a small firm deals with the decision issues leading to the implementation of a new technology.

Research Objectives

The specific research objectives of this study are as follows:

1.) To develop and define a model describing the decision process whereby a small to medium sized firm decides to implement EDI on the route to placing an electronic bid on a government contract.

2.) To design a survey instrument which measures the progress of a small to medium sized Oklahoma firm in the decision process of adoption and implementation of EDI and placing an electronic bid on a government contract.

3.) To conduct a pilot test with the survey instrument on a sample of three Oklahoma small to medium sized firms.

4.) To identify areas of future research in the problem of understanding the effects of the requirement of mandating EDI implementation in the Department of Defense electronic bid process.

Assumptions and Delimitations

This study tries to lay a basic foundation for understanding the decision processes that a small to medium sized firm must undergo before the decision to bid electronically on a government contract occurs. This study only looks at the direct effects of introducing EDI into this decision making process and does not include other issues within the larger subject of Electronic Commerce. The other assumptions and delimitations for this study include:

1.) This study begins with the initial inquiry of a small to medium sized firm into the government bidding processes.

2.) This study ends with the decision by a small to medium sized firm to actually place a bid electronically on a Department of Defense contract using EDI.

3.) This study does not address detailed EDI implementation issues.

4.) This research is performed from the perspective of the small to medium sized firm with a focus on understanding the firm's decision making process and how far along in the electronic bid process the firm progressed.

5.) The results of this study are not intended to be generalized to other government contracting processes.

6.) This study leaves evaluation of the introduction and use of EDI into the Department of Defense bidding process for future research.

The Importance of the Study

In order to cut costs and improve efficiency the Department of Defense has been directed to implement EDI as the fundamental tool for conducting its procurement business. To promote the involvement of small businesses in contracting with this revised government system, the decision to implement the new technology of EDI and the issues associated with EDI adoption, financing and use by small to medium sized companies (1-500 employees) need to be studied.

An understanding of the decision process to bid electronically and the pitfalls associated with having to conform to the EDI standard, from the viewpoint of a small to medium sized firm, could lead to identifying the support needed to help alleviate a large percentage of the residual opposition to EDI utilization and bidding with the government by small companies. If this is accomplished, the outlook for participation by small to medium-sized companies in electronic government contracting and procurement activities looks positive.

CHAPTER II

REVIEW OF LITERATURE

Introduction

This research proposes a model and a related survey instrument which studies the effects of the Department of Defense contracting process requirement of EDI on the decision making process of a small to medium-sized company (1-500 employees) to participate in the placing of a bid electronically on a Department of Defense contract. Firms face three different broad issues when considering implementation of EDI: the strategic issues internal to the company structure which leads to the ultimate decision to make a strategic commitment to EDI technology, the technical implementation and feasibility issues such as software, technical drawing packages [4], standards, Value Added Networks, transaction maps, segment terminators, and element separators and headers [38], and the financial issues and costs associated with education, training (large learning curves), and implementation management which are estimated to constitute 90% of EDI implementation costs. [41]

The first part of this chapter looks at the literature introducing EDI and its importance in the business activities of the future. The second part of this chapter deals with the pressure being placed on small businesses by large businesses and government to adopt EDI standards and processes. The third section deals with the major management

issues and benefits of EDI use and implementation and places them in context with the specific problem of government contracting and small business participation in the electronic bidding process. The final section introduces a process model for the adoption of a new technology and the resulting decision making process that a small firm undertakes in the acquisition of the technology. Please note that the majority of the existing literature on EDI is qualitative and not research based.

Electronic Data Interchange

Electronic Data Interchange or EDI is a subset of the larger Electronic Commerce or EC push which is the wave of the future for business. EDI allows companies to communicate electronically. "The information exchange pertains to such matters as requests for quote, bids, purchase orders, order confirmations, shipping documents, invoices and payment information. A recent survey showed that almost eighty percent of the documents transacted between firms use paper as the medium to carry information." [29] In most businesses turnaround time for information plays a large role in determining costs. EDI provides many benefits such as just-in-time and quick response delivery of goods and has "...managed to convince the business world that EDI can play an enormous role in improving efficiency." [38]

EDI has been embraced by such large "hub" companies as Wal Mart and J.C. Penny Co. A hub company is a "...very large organization that buys in large quantities from multiple vendors and primarily use their EDI technology for purchasing transactions." [38] These hub companies stand to save large amounts of money by not having to re-key information from purchase orders, payment orders, shipping documents,

invoices and receipts. Due to the substantial cost savings for large corporations, EDI has become integrated into the fabric of large corporate America. [38]

The Introduction of EDI in Small Businesses by Large Businesses and Government

Due to the large amounts of money that large hub companies can save by utilizing the EDI technologies, a lot of pressure is being placed on small businesses by large businesses and even by government to adopt EDI standards and processes. Government facilities such as the Department of Defense and the Defense Logistics Agency have been given a Presidential Mandate (See Chapter 1) to implement EDI to save time and money and to increase competitiveness with large industry. The same basic tenets of good business apply to government red tape and bureaucracy: the less re-keying that needs to be done, the more time and money is saved. Since 90% of all U.S. businesses are classified as small, [19] and hub companies and the government are supplied by many small vendors for the majority of their procurement activities, the push for small business to implement EDI has become immediate.

Large businesses are not always extremely friendly in their rush to force small business to comply with EDI standards. A notorious form of notification of forced EDI compliance, the "letter bomb", puts a small business in the situation of either adopting EDI processes or losing a major customer. [38] Government too has been pushing for small business to comply and unfortunately few initiatives have been made to make the trip to EDI compliance an easy one. [21]

Management Issues Faced by Small Businesses in Selection and Implementation of EDI

By itself, EDI is good. If all suppliers complied with it, EDI would be better since manual bookkeeping entries would be minimal. However, there are certain costs associated with learning and using EDI, especially for small business.

The main issues associated with EDI implementation fall into two large categories: 1. technical issues such as software, standards, technical drawing packages, [4] VANs, transaction maps, segment terminators, and element separators and headers, [38] and 2. human issues and cost associated with education, training (large learning curves), and implementation management which are estimated to constitute ninety percent of EDI implementation costs. [41]

EDI doesn't have to invoke large start up costs. Small suppliers can become EDI capable with off the shelf PC-based software that costs around $700. [38] Small firms also worry about the complicated standards and how to integrate EDI into their corporation. For those firms who are not willing to deal with such issues there are EDI service bureaus, also known as VAS or Value Added Services that will provide extra fee-based services beyond standard Value Added Network (VAN) services to its customers. These VASs take EDI notices from a hub's VAN mailbox, send that EDI information to the specified supplier, translate that supplier's documents--such as invoices or shipping notices--into EDI format and send it back to the hub. Such VAS services are specifically applicable to small Government contractors who opt not to invest in EDI-related computer hardware and software.

But even though many of the small businesses can become EDI capable for less than $1000 in software or utilize the services of a VAS there are still many costs hidden in the human issues. The DoD recently conducted a survey of its small business suppliers. In this study it was determined that the "absence of formal information, education, and training are believed to be major factors which hinder small business participation". [19]

In order to become EDI capable a small business would need to purchase a PC, learn how to use it, adopt basic ANSI X12 EDI standards across their company's departments and deal with all of the related management issues that go into educating their personnel on EDI procedures. The time investment alone for a small company is enormous and takes time away from normal business transactions. This is a cost that few small businesses are capable of absorbing and when contracting with the government, the payback period is long. [9]

Lamm, [34] analyzed a questionnaire that asked for the main reasons that contractors and subcontractors disliked doing business or refused to become involved in doing business with the government. The resulting analysis gave a frequency listing of reasons cited, some of which are (in declining order of frequency cited):

1. Burdensome Paperwork
2. Government Bidding Methods
3. Inflexible Procurement Policies
4. More Attractive Commercial Ventures
5. Low Profitability
6. Government Attitude(s)
7. Delays in Making Awards
8. Inconsistent Quality Requirements or Standards too High
9. Late Payment/ Nonpayment

(p. 71)

Additionally, a second study commissioned by the Small Business Administration, and conducted by Cooper and Company, [11] a consulting firm from Stamford, CT, lists the costs of preparing offers as an "important factor in limiting direct participation in Government solicitation/ award processes..." (pg. 85). This study also cited the following issues in affecting the attitudes of small businesses towards limiting participation in bidding (pg. 86):

1. Some organizations have an inside track
2. Marketing costs/ difficulties with respect to the prebid phase
3. Unnecessarily restrictive product/ service specifications
4. Inadequate profit on Government business

Having to deal with the inertia inherent in the governmental process is a major obstacle in the solicitation of small business participation. EDI has been heralded in the government advertising as a solution for many of these problems. Officially, the Office of the Defense Computer-Aided Acquisition and Logistics Support (CALS) Executive vision statement is, "An integrated data environment created by applying the best commercial standards and practices for the functional management and exchange of business and technical information between Department of Defense and its industrial supply base." [2]

Soliciting small business participation requires the potential small firm supply base to buy into the EDI promise. [19] EDI provides these small to medium sized firms with many new costs and benefits to weigh. Currently there are several new texts available which deal with EDI management issues and can help small firms deal with the initial decision to select EDI such as: EDI or DIE: Will your corporation be ready for the 21st

Century?[3]. One comprehensive text, Electronic Data Interchange: A Total Management Guide,[23] lists the following costs and benefits for the acquisition of EDI (pg. 20):

Benefits	Costs
1. Reduction in Transaction Time	1. Software/ Hardware Costs
2. Reduction in Keying Activity	2. Transmission Costs
3. Improved Responsiveness to Customer	3. Training
	4. Time Value Costs

Each firm interested in bidding with the government of the future has to work through the process of implementing the relatively new technology of EDI. This process involves the complex tasks of weighing out the pros and cons of dealing with the government process and now, additionally, involves buying into the promise of EDI and weighing out its benefits and costs with respect to the company's strategies for the future.

Adoption of a New Technology

This final section introduces a process model for the adoption of a new technology and the resulting decision making process that a small firm undertakes in the acquisition of the technology. The purpose of introducing this model is to provide a basis for an enhanced model showing the decision processes necessary to adopt EDI technology into the context of the government bid process.

The literature in the area of technology adoption seems to center on general guidelines for a manager (usually inside a large corporation) on planning for, implementing or facilitating a specific technology adoption project.[12,13,14,30,39] Occasionally, the literature addresses the more specific management dilemmas of

technophobia, resistance to change of current technologies, perceived benefits , and users' perspectives of change and the perceived equity of the change. [28,31,37,40,42] Only a few articles address the specific problem of formulating a model of the process of technology adoption. [17,35,48,49]

The process model that is used as a baseline in this study was developed by Langley and Truax. [35] It is based on longitudinal case studies of new technology adoption in five smaller Canadian manufacturing firms. This study developed an "inductive process model that views the technology adoption process as a partially nested set of three parallel and interacting sub-processes that are different in nature: the strategic commitment process, the technology choice process and the financial justification process." (pg. 619). Figure 1, shows the three sub-processes as proposed by Langley and Truax in context.

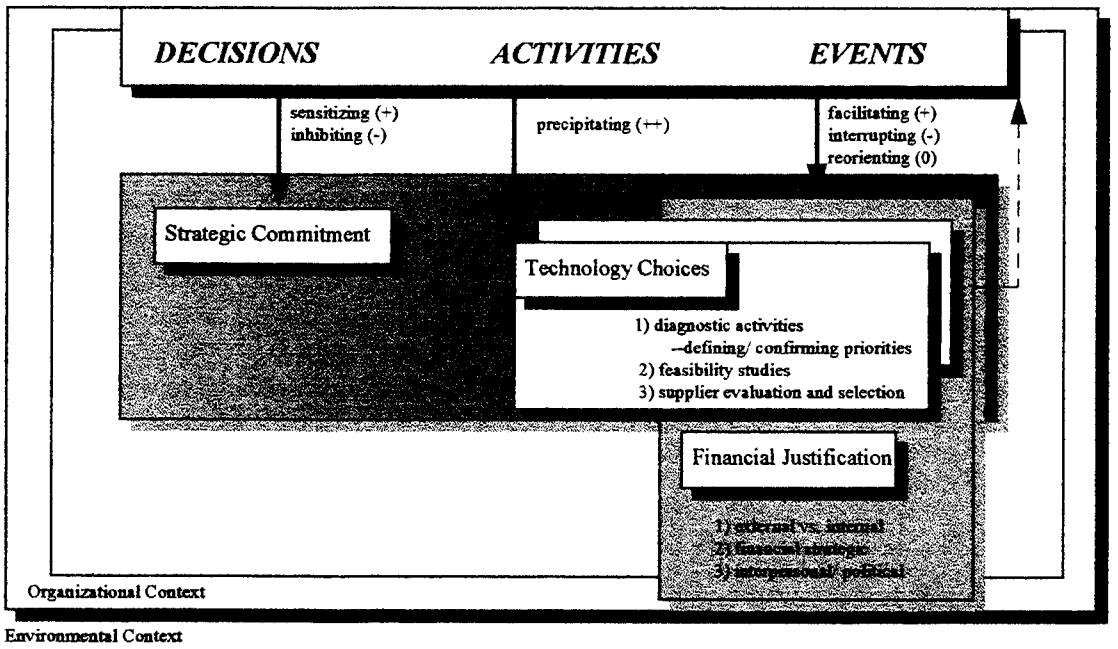


Figure 1. The Inductive Process Model of New Technology Adoption (Langley and Truax, pg. 630--revised)[35]

Briefly, the strategic commitment process is composed of decisions that are part of an informal process with unclear boundaries. This commitment process is experienced by the top management of the company and leads to a psychological commitment to the new technology. As stated by Langley and Truax, "... although this process is the most crucial in determining whether a firm will or will not adopt new technology, it is also the most difficult of the three sub-processes to pin down because it is largely an informal incubation process in the manager's mind that has no clear beginning or end. To illustrate this, the process is represented in Figure 1 by a 'gray zone' with ill defined boundaries that usually begins prior to the starting point of the 'technology choice' process, but which may continue even after this. In the diagram, the gray zone darkens over time suggesting gradually increasing commitment." (pg. 631).[35]

The technology choice process is easier to pin down since the processes involved are usually "...explicit, purposeful, and formal--they leave concrete traces in the form of documents." (pg. 635)[35] This process has concrete activities and decisions dealing directly with the technology project. Additionally, the process can be defined in terms of several categories including: diagnostic activities (defining/ confirming priorities), feasibility studies, and supplier evaluation and selection. [35]

The third process, the financial justification process, usually occurs last on the timeline of the process. Activities include, "...the preparation of formal applications, public relations and other kind of negotiations....efforts to obtain funds began some time before the details of technology acquisition had been worked out. This was necessary

because even when successful, the process was often time-consuming and lengthy, especially when government sources were involved." (pg. 639) [35]

All three of these subprocesses are critical to understanding the decision making process that a small firm undertakes when faced with adoption of a new technology. In the case of government bidding, EDI is the new technology that small firms must consider adopting. The decision making process that follows after the initial request for information on placing a bid should parallel Langely and Truax's Technology Adoption in Small Firms Model. Anywhere along the resulting decision process timeline a company could jump ship and decide that the added work and costs associated with adopting EDI are just not balanced out by the benefits of obtaining a government contract. The following research attempts to locate these points of failure in the decision process timeline and designate the major reasons why they occurred.

Summary

There are obviously many costs associated with implementing EDI. For the small business owner, these costs may be nearly insurmountable even though EDI implementation may become mandatory to maintain customer supplier relationships. In the case of government contracting, this study looks at the decision making process leading up to the placing of an electronic bid on a contract that small companies face when forced to deal with the prospects of EDI implementation. With the information gained from these companies it will be possible to provide resources and training to pave a smoother road to EDI implementation.

CHAPTER III

METHOD OF INVESTIGATION

Introduction

This study is designed as a descriptive study to obtain needed information on small to medium-sized business' experiences with EDI implementation and the DoD's procurement processes. The present chapter deals with the primary tools used to gather the data, the population considered and the design and implementation of the survey instrument.

Research Tools Used

The primary research tool is a pilot survey which was used with a select group of three small to medium sized businesses for the purpose of evaluating the survey instrument. A phone interview was initially chosen as the method to populate the survey instrument. The reasons behind the choice of a phone interview were:

1.) A restricted amount of time was available in which to conduct the interviews,

2.) Telephone interviews are less costly to conduct then face to face interviews.[25]

Each company that agreed to participate received by fax an advance copy of the pilot survey instrument. The advance copy of the survey was prefaced with an introductory one page letter. This letter was followed by the survey which included a total of twenty seven questions with room for brief responses on the supplied lines (See Appendix II). The companies who participated were supplied with a summary of the results of the survey.

The Population

A list of the companies participating in each of the four Virtual Enterprises which were part of the Defense Logistics Agency, phase one experiment in CALS were compiled.[8] Companies who met the small to medium-sized business criteria (1-500 employees) and who were experienced in bidding or trying to place a bid using EDI technology were pre-selected. Only two companies from this list were contacted. One additional company was selected as a contact of the Oklahoma State University's OCIDM office. The names of the companies will be kept confidential.

The Sample

The three selected companies were initially asked to participate by phone interview. The contact person within the company was the President of the company for the first company, the General Manager for the second company, and the Sales Administrator for the third company. The sample was limited to three companies due to the lack of an EDI capable population in existence at the time of this research. In the near future, this survey instrument will be more suitable for extended use due to the expected growth in the population of companies implementing EDI for government procurement activities.

Design of the Survey

The survey instrument for this study is a five-page survey developed through a review of the literature, review of the available CALS DLA directives and consultation with Oklahoma State University faculty members. Its emphasis is the gathering of information on the decision making process leading to placing an electronic bid on a

government contract and is intentionally brief to promote a higher response rate. Every effort was made to develop a survey that was easy to follow and complete, was clearly stated, and did not ask for proprietary company information.

The survey questions directly relate to a timeline (Figure 2) derived from the Langley and Truax model of new technology adoption found in the literature review (Figure 1) [35]. This model was revised by the researcher in an attempt to fit it into context with the government bidding process (Figure 3). The revised model is found in Figure 4. A breakout of the different paths that a company could follow through the course of answering the survey can be found in Figure 5. Each path ending corresponds to a different point on the decision to bid timeline (Figure 6) derived from the revised model (Figure 4). The goal of the revised model and the resulting survey questions and corresponding timeline are to understand more fully the decision making processes that small firms undergo on the path to placing an electronic bid on a government contract.

- S = Strategic Commitment
- T = Technology Choice (EDI)
- F = Financial Justification

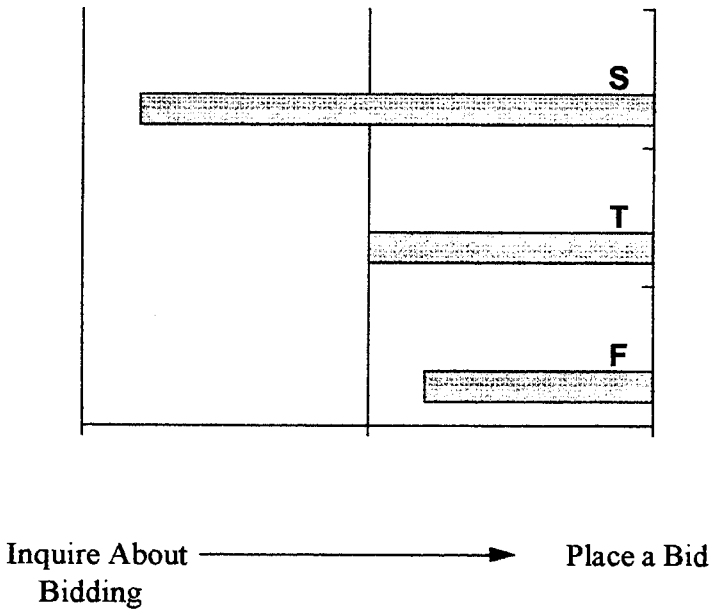


Figure 2. Revised Model of New Technology Adoption in Smaller Firms in the Context of Government Bidding

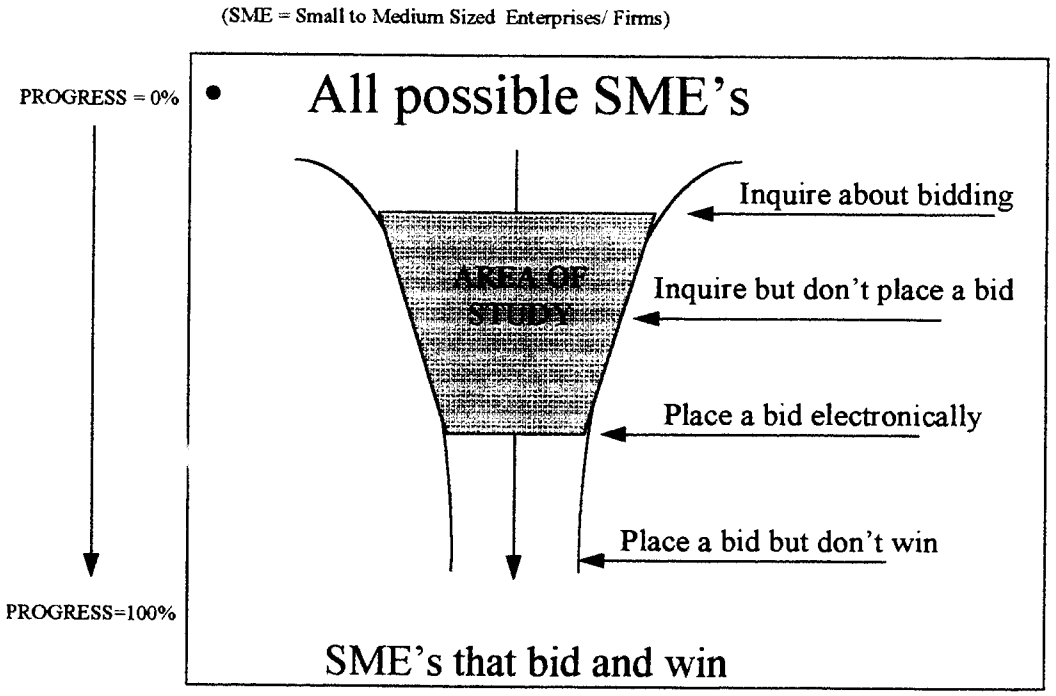


Figure 3. The Government Bid Process Funnel

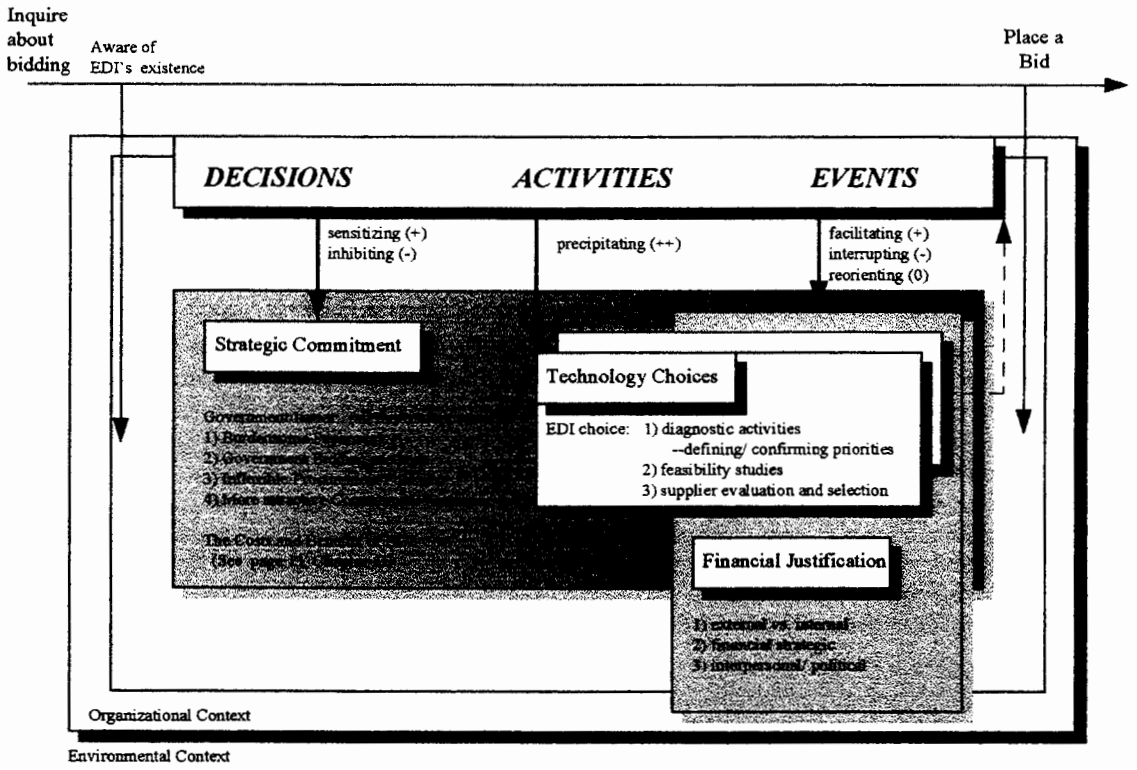


Figure 4. The Revised Inductive Process Model in the Context of the Decision to Bid Process

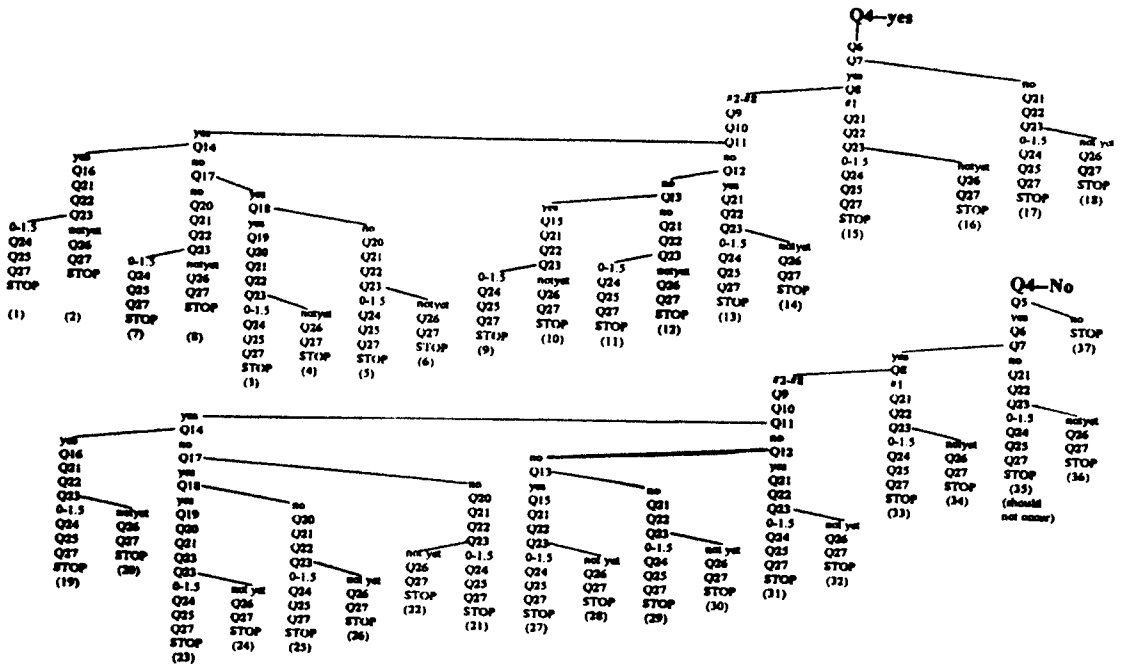


Figure 5. Breakout of the alternative path routes possible through the survey

- Approximate survey path ending points are designated by the numbers corresponding to Figure 5.

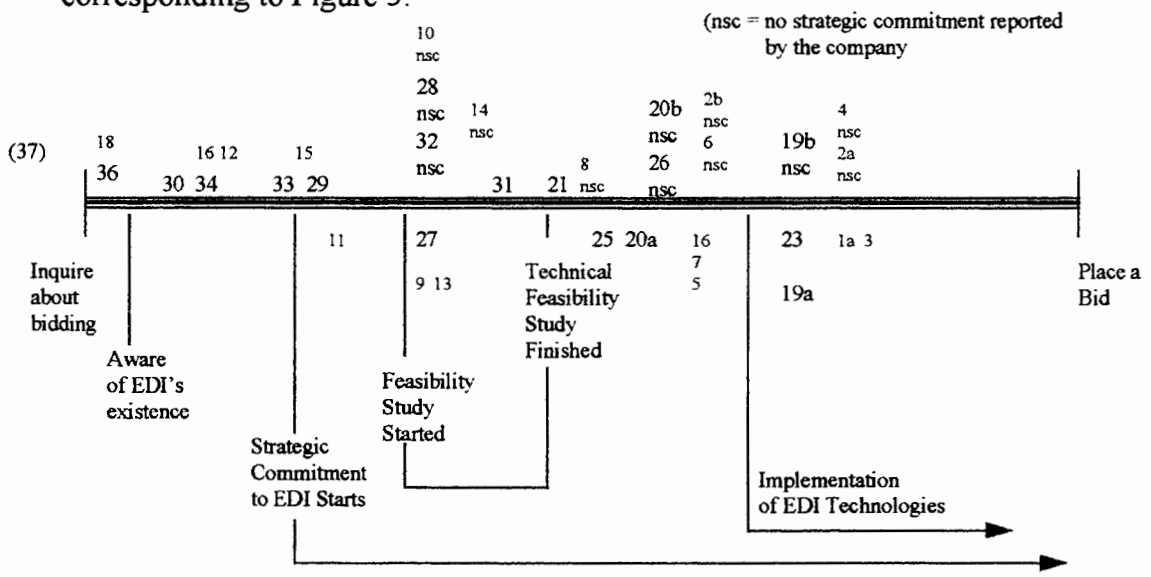


Figure 6. The Decision to Bid Process Timeline

Procedures used to Administer the Survey

Three companies were selected to receive a copy of the survey: ***The Questionnaire on the Introduction of Electronic Data Interchange into the Decision Making Process Leading to Bidding with the Government.*** For those companies that agreed to participate a copy of the survey was sent by FAX along with a letter of explanation of the purpose of the survey instrument. All companies contacted by phone agreed to participate in the survey so no procedures for alternative selections were necessary. The method of a phone interview however was rejected in favor of the return of the completed survey, by the participating company, by FAX machine.

After the completed surveys were returned the answers to the survey questions were compiled in tabular format and the paths through the course of the survey mapped for plotting on the process timeline (Figure 6). The researcher then has a measure of how far each company managed to progress in relation to the other participating companies along the decision to bid electronically process timeline.

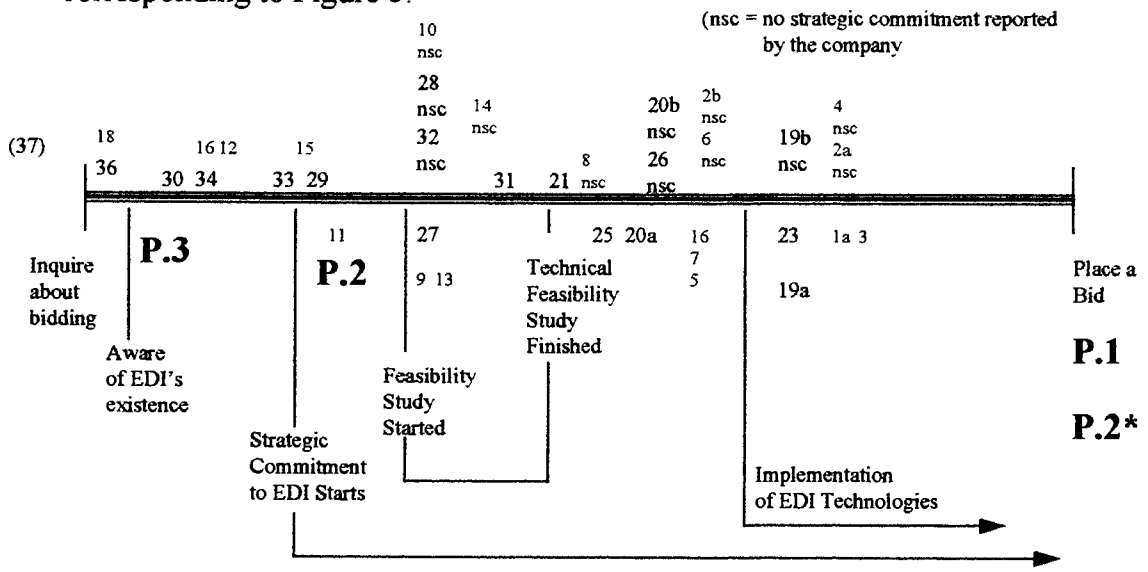
CHAPTER IV

RESULTS

As explained in Chapter III, the survey was delivered by FAX to three separate manufacturing companies whose names will remain confidential. The results of the completed surveys, returned to the researcher by FAX, were categorized by path number (see Figure 8) and placed on the timeline of Figure 7. This return of the completed surveys by FAX differed from the original research plan outlined in Chapter III. All companies contacted expressed a desire to FAX the completed survey back in place of a phone interview. The FAX machine allowed company respondents to fill the survey out at their leisure and return it at the best available time. The respondents consisted of a company president, a general manager, and a sales administrator. The survey took approximately five minutes for each company to complete. The disadvantage to this method was the lack of interaction between the researcher and the company; however, the respondent from company P.1 called on his own initiative to express his interest in EDI and to raise some valid issues which may need to be addressed in the next version of the survey instrument.

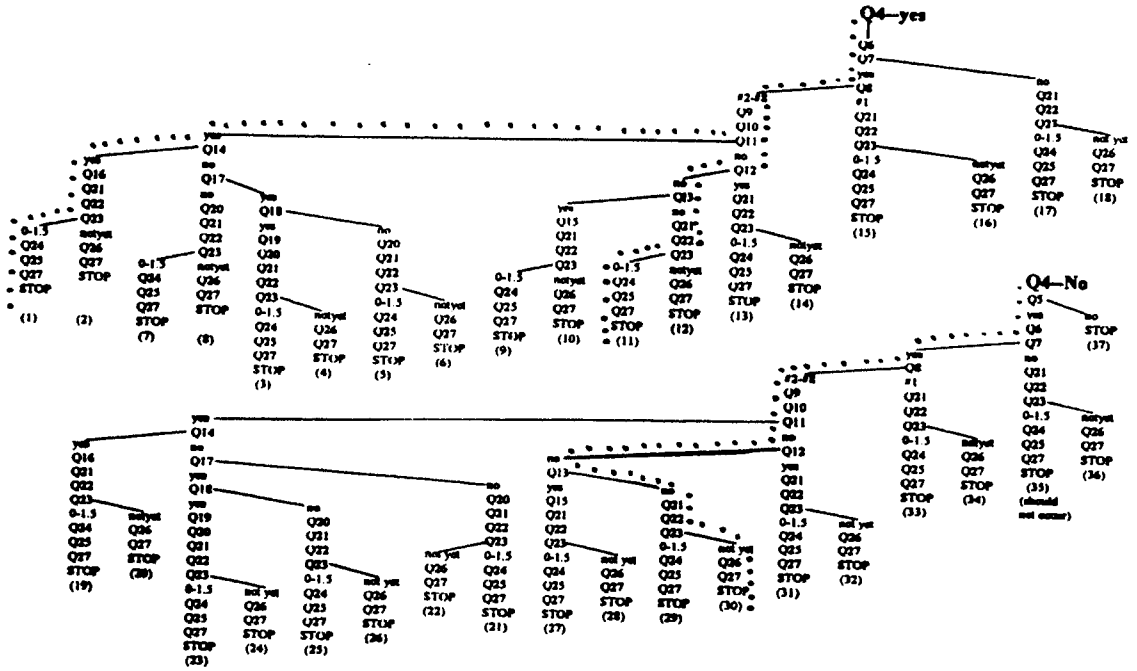
The companies, known as company P.1, P.2, and P.3, fell on the timeline as shown in Figure 7 as a result of the paths followed by each company designated by a dotted line

- Approximate survey path ending points are designated by the numbers corresponding to Figure 5.



(**P.2*** is where P.2 should be located)

Figure 7. The placement of companies P.1, P.2, and P.3 on the Decision to Bid Process Timeline.



Company:	Path #:
P.1	1
P.2	11
P.3	30

Figure 8. The survey path analysis of P.1, P.2, and P.3

on Figure 8. The tabulated results of the survey answers can be found in Appendix III. A summary of each company's survey answers are found in the section entitled **Case Studies**. The conclusions and knowledge gained from these case studies and the validity of the survey analysis are found in Chapter V.

Case Studies

Company P.1

P.1's survey was completed by the president of the participating company. P.1 has between 10-50 employees and is fully EDI capable. P.1 is currently considering putting in a satellite system to facilitate the downloading of EDI information, specifically technical drawing packages, which ordinarily takes a very long time (at great cost) to acquire by modem. The answers to P.1's survey questions are summarized below:

P.1 has placed a bid on a government Department of Defense contract. P.1 originally contacted a Van-Sat for information on the government bidding process, and P.1 is aware of the existence of EDI technologies. P.1 ranks itself with respect to EDI implementation as: implementation of an EDI system is currently underway, have a basic PC based--non integrated EDI system in the company currently and use a VAS (Value Added Service) to provide EDI services for them. P.1 wished to implement EDI because they wanted to maintain their current government related market, hoped the government bidding process would become less cumbersome, and wanted to become more competitive in the government bidding market only. Financial issues arose for P.1 at the point of initial inquiry into bidding and a feasibility study on the potential use of EDI was completed and was financially favorable for P.1. P.1 proceeded to implement EDI technologies into the

company within one week after the feasibility study was completed. P.1 did encounter EDI literature or other venues of advertisement that encouraged the company's participation however P.1 does have some concerns about dealing with the government process, specifically, burdensome paperwork and government bidding methods.

P.1 made a strategic commitment, without hesitation due to dealing with the government processes, to EDI technology within 0-5 months of inquiring into the process of placing a bid on a Department of Defense or other government agency contract. P.1 weighed the following benefits and costs of EDI before making a strategic commitment to EDI: reduction in transaction time (lower costs), reduction in keying activity (fewer errors, potential personnel reductions), improved responsiveness to customer (increased sales), and training for the company (in-house), training for the company's trading partners. Several suggestions were made by P.1 to improve upon the survey and can be found in the section entitled **Suggestions by Participants for Improvements**.

Company P.2

P.2's survey was completed by a General Manager within the company. P.2 has between 51-100 employees in the company and has some basic EDI capabilities. P.2 has placed a bid on a government Department of Defense contract and received information on the government bidding process through the local government bid assistance center. P.2 is aware of EDI and ranks itself with respect to EDI implementation as having a basic PC based--non integrated EDI system. P.2 decided to implement EDI because they wanted to increase competitiveness in both government and commercial business opportunities.

Financial issues related to EDI's feasibility within P.2 started to arise between the point of initial inquiry into the bid process and a strategic commitment by the company to EDI technology. P.2 never started or completed a feasibility study on the potential use of EDI within the company. P.2 did encounter EDI literature or other venues of advertisement which encouraged the company's participation in Electronic Commerce. P.2 is concerned about the burdensome paperwork involved in the government process. P.2 waited for more than 1.5 years after the initial inquiry into the process of placing a bid before they made a strategic commitment to EDI technology. They did not experience any hesitation in making a strategic commitment to EDI technology due to concerns about dealing with the government process. P.2 did weigh the following benefits and costs to EDI: reduction in transaction time (lower costs), reduction in key activity (lower costs), improved responsiveness to customer (increased sales), and no costs were considered. P.2 did not make any suggestions for improvement of the survey instrument.

Company P.3

P.3's survey was completed by a Sales Administrator within the company. P.3 has never placed a bid on a government Department of Defense contract. They have however inquired into how to place a bid. They contacted a "Direct Source" for information on the bidding process and are aware of EDI. They rank themselves with respect to EDI implementation as having very elementary knowledge and have started to "look into" bringing EDI into the company. P.3 initially considered EDI because they wanted to increase competitiveness in both government and commercial business opportunities.

Financial issues related to EDI have not yet been considered by P.3. A feasibility study has therefore never been started or completed by P.3. P.3 did encounter literature or another venue of advertisement that encouraged their participation in Electronic Commerce. P.3 does have some concerns about dealing with the government process: burdensome paperwork, government bidding methods, and delay in making awards. P.3 has not yet made a strategic commitment to EDI technology and has only weighed the software/hardware related costs of EDI, namely the costs of standards which were too high at $500.00 per standard with 15 or more standards required. P.3 commented that they had started to attend a training seminar on EDI but had never finished it, possibly due to the costs of the standards.

Check of Survey/Timeline Validity

The results of the survey analysis (the placement on the timeline of Figure 7) were checked against the company's perceptions of progress along the timeline. P.1's placement on the timeline was correct, however P.2's placement on the timeline was not correct due to the decision of P.2 to not perform a feasibility study (See the top portion of Figure 8, dotted line break point). Survey questions 11-13, which ask if a feasibility study had ever been completed or had ever been started within the company, determines which path the company ends up following through the rest of the survey instrument. Therefore survey questions 11-13 are a critical path determination point for the analysis using Figure 8. P.2 should be placed at the same point as P.1 on the timeline since they have actually placed a bid on a government contract using EDI technology even though they arrived at that point by a different method (Figure 7, P.2*). P.3's analysis results were confirmed to

be correct by the company. These results show that the analysis using Figure 8 provides more insight, than the timeline of Figure 7, into the important decisions made by each company.

Suggestions by Participants for Improvements

One company, P.1, offered suggestions to improve the survey instrument:

1. The survey instrument needs to ask, "Did anyone in the company attend an EDI conference?"

2. The survey instrument needs to ask for the title of the person within the company attending the EDI conferences.

3. For Defense Contractors, the survey instrument needs to inquire if the company is aware of the choices for a VAN (value added network).

4. The survey instrument needs to ask for the title of the person within the company making the EDI decisions.

Corrections to the Survey Instrument

The survey instrument was evaluated for bias by Dr. Ken Kiser of the Oklahoma State University, Department of Sociology. He suggested a few changes which are outlined below in (4), (5) and (6). Dr. Kiser felt that the survey instrument was clear and concise and reflected no researcher bias. The following suggestions are made by the researcher to improve the survey instrument for future studies upon a larger population:

1. A question 4a needs to be added which reads, "Has your company ever placed a bid electronically (currently or in the past) on a DoD contract?" (Differentiation among EDI capable bidders and non EDI capable bidders)

2. Questions concerning government related concerns need to be expanded and the specific effects on adoption of EDI need to be considered in the Question 21-26 section of the survey. (Expansion of the area of study shown in Figure 3)

3. The necessity of having performed a feasibility study to progress on the timeline needs to be abandoned and a better category of progression on the timeline established at or near the same point of the timeline as the feasibility study. (Results from company P.2)

4. Questions Number 17 and Number 18 both need to contain an additional blank, "Why?" following each yes and no answer. [32]

5. Section I. General Information and Company Profile needs to ask the questions, "How long have you been with the company?" and "How long have you held your current position within the company?". [32]

6. Question Number 27 needs to add, "Please list any other issues that were not addressed that are within the parameters of this study that you feel should be addressed in the next version of this survey instrument." [32]

7. The four issues raised by P.1 (as listed earlier) need to be considered for incorporated within the survey instrument.

CHAPTER V

CONCLUSIONS

The survey instrument performed fairly well in a pilot study of three companies. The comments from the participants in this study were generally favorable and the results of this study raised some valid issues that need to be addressed in the next version of this survey instrument. The model used to develop this instrument needs to be further developed as the sophistication of the survey questions and the level of detail that the survey addresses is advanced. Since this is the first research performed in this area, the model and the survey instrument are of great interest to many people and companies associated with the CALS program, the DLA and the DoD. Hopefully this first step will form a solid cornerstone for future research into technology transfer and into the understanding of the decision to bid electronically on a government contract by small to medium-sized firms in Oklahoma.

Conclusions from Case studies

P.1 is doing very well with regards to EDI implementation and use. Per phone conversation, P.1 is excited about the potential business opportunities that exist now and in the future using EDI. P. 1 sees EDI as the necessary technology of the future and is very adamant about involving all of its trading partners in EDI seminars and training.

P.2 has placed a bid on a government contract but it is the researcher's opinion that P.2 is still in a vulnerable position with regards to EDI implementation and use. Since P.2 had never started or completed a feasibility study on potential uses of EDI within the company, and since P.2 waited for more than 1.5 years before making a strategic commitment to EDI technologies with a non-integrated, basic PC system, it is possible that DLA or Department of Defense support may prove necessary or DLA requirements may need modification before a rebid could occur. Further research into the issues surrounding P.2's decision to place a bid may facilitate the understanding of the necessary DLA support to promote the occurrence of a rebid.

P.3 has never placed a bid on a government contract but has shown some interest in the past about learning about EDI. Unfortunately, the costs that P.3 learned about (standards with software and hardware systems) and other issues raised during an EDI seminar that P.3 attended, helped P.3 to decide to not bid. Upon brief inquiry, the researcher learned that P.3 was not aware of the existence of Value Added Services (VAS), otherwise known as an EDI service bureau. At the time of the phone conversation P.3 was very busy and did not have time to learn more about the EDI service bureaus. Support in terms of education on EDI services and easier access to EDI based information for small companies may advance the P.3 type companies further along in the decision to bid electronically process.

Knowledge Gained

The importance of this study lies in the new forms of organization in which this survey information is presented. This categorization of decision paths can be seen as

analogous to the carnival game of dropping a ball into a vertical maze of pegs and watching it bounce downward until it lands in a slot at the bottom. Depending upon which slot the ball falls into, you can win big or lose. The decision tree of figure 5 and 8 shows us the slots at the bottom (path numbers) and the major decisions (pegs) that the ball (company) bounces off as it proceeds through the process. Each of these pegs or decisions that a company makes can change the company's course through the maze. The challenge is to decide how to make the ball fall into the right slot at the bottom.

The tools used in this study provide us with a way to determine which paths and thus combination of decisions, give us the best overall results. All companies, however, will not be able to utilize the same paths to make it to the bidding decision. This is due to the differences inherent in each company. It may be possible, however, to categorize companies and to adjust the support given to each category of company according to their needs. In the future, a company could fill out the initial survey (a more detailed version of the current survey instrument) and be classified according to their answers. The DLA would then know which information packet to send to the company in order to enhance the chances of that company placing a bid electronically. This classification process would also serve as a measure of how quickly companies can learn the necessary skills and technologies needed to utilize EDI technologies. A company initially classified as EDI non-capable may need to be followed up on and reevaluated at a later date with the initial survey instrument. This reevaluation would hopefully reclassify the company as further along the learning curve and DLA could adjust its support to that company accordingly with another packet of helpful information. Additionally, these companies would be more

willing to support the Department of Defense if they felt that the government process was designed to support them in return.

The DLA is not the only audience for this study. This study could also prove of help to small to medium-sized Oklahoma businesses, researchers in engineering disciplines studying technology transfer, and extension agents for manufacturing companies. Oklahoma businesses can use the study to help them to understand the importance of EDI education and literature. Seminars need to be attended in full before EDI's business potential and all of the options that are available under the umbrella of EDI technology (including VAS's) can be fully understood. A small company's best defense against the future is education on EDI and its uses within their company for commercial and government competition on contracts.

The study conducted by Langely and Truax was a process study of five small manufacturing firms.[35] It attempted to categorize the three general types of decisions made in the adoption of a new technology process: strategic, technology based, and financial. This study builds on that model by added many more layers of detail to the three-part general model. By building the decision tree of Figure 5, we are attempting to categorize several layers of detailed decision making within the process of attempting to place a bid. This advances the literature in the technology transfer area by proposing a logic and a tool that can be carried over into other technology adoption research issues.

Extension agents for small manufacturing firm support can benefit by understanding the common decisions made by small companies that typically create situations containing a higher frequency of problems (decision paths that don't lead to a

bid). They can then learn to steer their clients away from making the wrong types of decisions and guide them towards a more successful decision making process and a competitive bid.

The Importance of P.2

The importance of P.2 is that the decisions that P.2 made may affect their future ability to rebid on a Department of Defense contact. Their education level of the potential uses of EDI within their company may need to be supplemented due to the lack of a feasibility study being performed. A future survey with more detailed questions could help to resolve the issues surrounding the question of successful rebid. A suggestion for a new survey question would be " If your company has placed a bid in the past on a government related contract, would your company be inclined to bid again on another government contact?" "If no, Why?", "If yes, Why?".

P.2 provided this researcher with the information that a feasibility study does not necessarily have to be performed for a company to place a bid with EDI technology. This came as a surprise to the researcher since the literature[3,35] had often specified a feasibility study as a critical step in the implementation of EDI. This was a critical peg in the division of the paths of Figure 5. To monitor the progress of companies and to accommodate any number of possible decision paths, this part of the decision tree will need to be changed in future surveys by alleviating the necessity of having completed the feasibility study to place a bid.

In conclusion, this research will shed some light on the problem of understanding the types of decisions that lead to successful bidding, electronically, on a government

contract. It will also serve as a measuring instrument to monitor the progress of a company along the decision process timeline. Given this initial classification attempt, future research with more detailed classifications will be possible giving much more needed insight into the reasons for bidding or not bidding on a government contract. This research also contributes a new level of detail to the current literature on adoption of new technologies. With future research building upon this study, the attempt to understand and categorize the decision to bid attempts by small companies will become much more clear. Hopefully, with understanding, the support necessary to create a positive bidding environment for small to medium-sized firms will flourish.

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APPENDICES

APPENDIX I

Glossary

ANSI X12: (see X12)

Applications Link--The software bridge developed to facilitate the interface between a company's internal business management software and EDI translation software. [20]

Coding--The encoding of alphanumeric characters by a series of varying thickness bars to be read by a scanning device.[20]

CAD--the electronic storage of drawings developed using computer-aided design applications.[20]

Carrots-- encouraging small suppliers to convert to EDI with training incentives or subsidies.[38]

Contractor Registration Capability (CRC)--Functional asset of the DoD EC Program Office with oversight provided by DISA.[20]

Defense Mega Center--Columbus--A network entry point for EDI with DoD. [20]

Defense Mega Center--Ogden-- A network entry point for EDI with DoD. [20]

DISA--Data Interchange Standards Association [18]

DoD Electronic Commerce Information Center--Functional asset of the DoD EC Program Office with oversight provided by OUSD (AR-EC).[20]

DTIC--Defense Technical Information Center--provides full and executive summary versions of the DoD Electronic Commerce/ Electronic Data Interchange in Contracting Report, December 20, 1993, in electronic form. WWW access via http://www.dtic.dla.mil.[18]

EC (Electronic Commerce)--

The paperless exchange of business information, using Electronic Data Interchange (EDI), electronic mail, bulletin boards, electronic funds transfer (EFT) and other related technologies.[8]

The conduct of business transactions, supporting functions such as, administration, finance, logistics, procurement and transportation, between the Government and private industry using an integrated automated information environment to interchange business information.[20]

EDI (Electronic Data Interchange) --

The computer to computer exchange of business data in a standardized format.[8]

The computer to computer electronic transfer of business transaction information in a public standard format between trading partners.[20]

EDI Compliance Test Facility--functional asset of the DoD EC Program Office with oversight provided by DISA.[20]

EDI service bureau (also known as VAS--Value Added Service)-- a separate commercial organization that serves as an intermediary between the large hub EDI users and the smaller vendors that don't want to use EDI. These organizations provide extra fee- based services beyond standard VAN services to its customers. The bureaus take EDI notices from a hub's Value-Added network mailbox, send that EDI information to the specified supplier, translate that supplier's documents--such as invoices or shipping notices--into EDI format and send it back to the hub. Such VAS services are specifically applicable to small Government contractors who opt not to invest in EDI-related computer hardware

and software. A wide variety of such services are available and are generally advertised in publications such as the 1995 EDI Yellow Pages (Phillips Publishing; 1-800-777-5006). Many VANs also provide such services.[18,38]

EDI Translation Software--Software that translates data in and out of the ANSI X12 format.[20]

EFT (Electronic Funds Transfer)--the electronic transfer of money between accounts at different banks.[20]

E-Mail--The electronic transmission of information in a non-standardized format.[20]

FACNET--Federal Acquisition Computer Network: will help the Government move from a paper based procurement process to a process based on EDI.[20]

FAX--The electronic transmission of images through a FAX machine.[20]

Federal Acquisition Streamlining Act of 1994 (Public Law 103-355)--signed by President Clinton is meant to make the Federal procurement process a lot simpler. This act also establishes the Federal Acquisition Network (FACNET) which will help the Government move from a paper based procurement process to a process based on EDI.[8]

Hubs-- very large organizations that buy in large quantities from multiple vendors and primarily use the EDI technology for their purchasing transactions.[38]

Letter bomb-- a notice that unless a vendor promptly becomes EDI-enabled, it must end its business relationship with its large client.[38]

NEP--DoD Network Entry Point

Premenos Corporation--provides a repository of ANSI X12 and the UN/EDIFACT EDI standards in an electronic form. Web address: http://www.premenos.com:80/resources

RFPs/RFQs--Request for Proposal/ Request for Quotes

Spoke-- a potential EDI trading partner that is usually a small organization recruited by a hub and referred to a VAN for training. [38]

STX--a $2,295 PC software package called Supply Tech Translation that was developed in 1984 by Supply Tech Inc. of Ann Arbor, Michigan. It requires a minimum 286 system with 640 kilobytes of RAM and a hard disk. It will translate any transaction based on X.12 and connect to every major VAN.[38]

Trading Partner PC--a less expensive EDI software (retails for $495) that is a generic Windows-based translation product made by TSI International of Wilton, Connecticut. This company also sells trading partner "kits" that are tailor made to a given hub's transaction set's requirements.[38]

Trading Partners (TPs)-- vendors whose computers can receive and respond to electronic purchase orders.[38], Parties or entities who exchange EDI transactions.[20]

TP in edi compliance test facility--Any customer, supplier or service provider (e.g., bank, manufacturer) that conducts business with a DoD activity.[20]

UN/EDIFACT--European EDI standards

VAN-- a Value-Added Network is generally a commercial entity (similar to a long distance telephone company, or a computer on-line service) that provides communications services, electronic store and forwarding mailboxing, and other related services for EDI transactions. VANs are necessary because it would be too expensive and impractical to establish point-to-point connections with all of a company's trading partners. VANs are also useful because they are accessible to a company regardless of physical location,

support reliable connectivity to the trading partners via varying communications speeds and protocols, provide security for a company's transactions including audit trails, and generally offer other value added service features and ANSI X12 EDI translation software.

VAN in edi compliance test facility--A public or private packet-switched network that provides a variety of services which allows TP's (trading partners) to have one communication environment.[20]

VAS--Value Added Service : (see EDI service bureau)

Work-flow Automation--The use of automated processing in everyday business operations.[20]

X.12--The American National Standards Institute EDI standard [38]

APPENDIX II

QUESTIONNAIRE ON THE INTRODUCTION OF ELECTRONIC DATA INTERCHANGE INTO THE DECISION MAKING PROCESS LEADING TO BIDDING WITH THE GOVERNMENT

This questionnaire is a survey to determine the effect of the Department of Defense contracting process requirement of EDI (Electronic Data Interchange) on the decision making process of a small firm leading to placing a bid on a Department of Defense contract. Please complete the questionnaire by checking (☑) the appropriate response and filling out the blanks when necessary. A summary with the results of this research will be sent to those companies that respond to the questionnaire. Thank you for your cooperation.

Section I. General Information
—Company Profile—

---

1. Company name _____

2. Your position or title in the company _____

3. Number of employees:

_____Less than 10 employees
_____10-50 employees
_____51-100 employees
_____101-150 employees
_____151-200 employees
_____201-250 employees
_____more than 250 employees

Section II. Current Status in Decision to Place a Bid Process
Complete only the questions which pertain to your company's situation by placing a checkmark next to the appropriate response.

---

4. Has your company ever placed a bid (currently or in the past) on a government DoD contract?
_____yes *(proceed to question 6)* _____no *(proceed to question 5)*

5. Has your company ever inquired about how to place a bid on a DoD or other government agency contract? _____yes *(proceed to question 6)*
_____no *(Please stop filling out this survey. Thank you for your participation)*

6. Which agency or source did your company contact for information on the government bidding process?
_____ The local government bid assistance center
_____ A private consulting firm which specializes in government bidding
_____ The World Wide Web Department of Defense's Homepage Bidders Assistance Handbook
_____ Other: _____

7. Is your company aware of Electronic Data Interchange (EDI)?
_____yes _____no *(Please proceed to question 21)*

8. How would you rank your company's progress with respect to EDI implementation?
_____ 1: Very elementary knowledge--aware of its existence *(proceed to question 21)*
_____ 2: Have started to "look into" bringing EDI into my company (EDI has made it onto a list of company priorities and considerations)
_____ 3: Have actually done a feasibility study of using EDI in my company
_____ 4. Implementation of an EDI system is currently underway
_____ 5: Have a basic (PC based--non integrated) EDI system in my company
_____ 6: Use a VAS (Value Added Service) to provide EDI services for me
_____ 7: Have an advanced EDI (mainframe based-- integrated) system in my company
_____ 8: Other: _____

9. Why did you decide to implement EDI or make a strategic commitment to learn more about EDI in your company?

(Please check all that apply)

_____ 1: Wished to maintain current government related market
_____ 2: Hoped the government bidding process would become less cumbersome
_____ 3: Wanted to become more competitive in the government bidding market only
_____ 4: Wanted to become more competitive in the commercial sector only
_____ 5: Wanted to increase competitiveness in both government and commercial business opportunities.
_____ 6: Other _____

10. When did Financial Issues related to EDI's feasibility within your company start to surface?

_____ 1. Financial Issues have not yet been considered.
_____ 2. At the point of initial inquiry into bidding.
_____ 3. Between the point of initial inquiry into bidding and a strategic commitment by the company to EDI technology.
_____ 4. At the point of the company's strategic decision to commit to EDI technology.
_____ 4. Between the point of the company's strategic decision to commit to EDI technology and the implementation of an EDI feasibility study.
_____ 5. At the time of the EDI feasibility study.
_____ 6. Other _____

11. Was a feasibility study on the potential use of EDI within your company ever completed?

_____yes *(proceed to question **14**)* _____no *(proceed to question **12**)*

12. Is a feasibility study on the potential use of EDI within your company taking place at this time?

_____yes *(proceed to question **21**)* _____no *(proceed to question **13**)*

13. Was a feasibility study on the potential use of EDI within your company ever started but not completed?

_____yes *(proceed to question **15**)* _____no *(proceed to question **21**)*

14. Was the results of the completed feasibility study on the potential use of EDI within your company financially favorable?

_____yes *(proceed to question **16**)* _____no *(proceed to question **17**)*

15. What was the main reason that the feasibility study on the potential use of EDI within your company was not completed?

*(Please check all that apply then proceed to question **21**)*

_____Cost benefit issues of EDI implementation looked unfavorable
_____Payback period issues looked unfavorable
_____Favorable payback but no currently available resources to purchase EDI technologies.
_____The process length of EDI implementation was too long
_____Problems associated with the Government process were encountered
_____Other: _____

16. If the results of the completed EDI feasibility study were favorable to your company approximately how long after the feasibility study did your company start to implement EDI technology into the workplace?

_____0-5 months _____6-12 months _____1-1.5 years _____1.5+ years
_____ EDI implementation has not yet occurred

*(Please proceed to question **21**)*

17. If the results of the completed EDI feasibility study were not financially favorable to your company did/does your company still consider possible EDI implementation?

_____yes *(proceed to question **18**)* _____no *(proceed to question **20**)*

18. At this current point in time have you implemented any EDI technologies?

_____yes *(proceed to question **19**)* _____no *(proceed to question **20**)*

19. Approximately how long after the financially unfavorable feasibility study did your company start to implement EDI technology into the workplace?

_____0-5 months _____6-12 months _____1-1.5 years _____1.5+ years

*(Please proceed to question **20**)*

20. What was the main reason that the feasibility study on the potential use of EDI within your company was not favorable?

*(Please check all that apply then proceed to question **21**)*

_____1. Cost benefit issues of EDI implementation looked unfavorable
_____2. Payback period issues looked unfavorable
_____3. Favorable payback but no currently available resources to purchase EDI technologies.
_____5. The process length of EDI implementation was too long
_____6. Problems associated with the Government process were encountered
_____7. Other: _____

21. Did your company encounter any EDI literature or other venues of advertisement that encouraged the company's participation in Electronic Commerce?

_____yes _____no

22. Did (Does) your company have any concerns about dealing with the Government process?
(Please check all that apply)

_____1. Burdensome Paperwork
_____2. Government Bidding Methods
_____3. Inflexible Procurement Policies
_____4. More Attractive Commercial Ventures
_____5. Low Profitability
_____6. Government Attitude(s)
_____7. Delays in Making Awards
_____8. Inconsistent Quality Requirements or Standards too High
_____9. Late Payment/Nonpayment
_____10.Other: _____

23. How long after inquiring into the process of placing a bid on a DoD or other government agency contract did it take before your company made a strategic commitment to EDI technology?

_____0-5 months _____6-12 months _____1-1.5 years _____1.5+ years

(Please proceed to question 24)

_____This company has not yet made a strategic commitment to EDI technology

(Please proceed to question 26)

24. Did your company experience any hesitation in making a strategic commitment to EDI technology due to concerns about dealing with the Government process?

_____yes _____no

(Please proceed to question 25)

25. Did your company weigh out the following EDI benefits and costs before making a strategic commitment to EDI? _____no *(proceed to question 27)*

(Please check all that apply and then proceed to question 27)

Benefits

_____Reduction in Transaction Time
- _____Reduced Inventory
- _____Increased Cash Flow
- _____Lower Costs

_____Reduction in Keying Activity
- _____Fewer Errors
- _____Potential Personnel Reductions
- _____Lower Costs

_____Improved Responsiveness to Customer
- _____Better Customer Service
- _____Increased Sales

Costs

_____Software/Hardware Costs
- _____Purchase of Software
- _____Modifications to in-house systems
- _____Maintenance

_____Transmission Costs (Third party charges or communications costs)

_____Training for your company
- _____In-house training
- _____Purchased training

_____Training for your trading partners
- _____In-house training
- _____Purchased training

_____Time Value Costs (Loss of float from earlier payment)

26. Is your company currently weighing out the following EDI benefits and costs before making a strategic commitment to EDI? _____no *(proceed to question 27)*

(If YES--Please check all that apply and then proceed to question 27)

Benefits

_____Reduction in Transaction Time
- _____Reduced Inventory
- _____Increased Cash Flow
- _____Lower Costs

_____Reduction in Keying Activity
- _____Fewer Errors
- _____Potential Personnel Reductions
- _____Lower Costs

_____Improved Responsiveness to Customer
- _____Better Customer Service
- _____Increased Sales

Costs

_____Software/Hardware Costs
- _____Purchase of Software
- _____Modifications to in-house systems
- _____Maintenance

_____Transmission Costs (Third party charges or communications costs)

_____Training for your company
- _____In-house training
- _____Purchased training

_____Training for your trading partners

(continued on the next page)

(Question 26 continued):

_____In-house training
_____Purchased training
_____Time Value Costs
(Loss of float from earlier payment)

27. Please list any other issues that were not addressed that you feel should be addressed in the next version of this survey instrument.

_____
_____
_____
_____
_____
_____

Thank you for your participation in this survey.

APPENDIX III

Question #:	Company P.1	Company P.2	Company P.3
2: Position or Title	President	General Manager	Sales Administrator
3: Number of Employees:	----------	----------	----------
<10			
10-50	X		
51-100		X	
101-150			X
151-200			
201-250			
>250 employees			
4: yes	X	X	
4: no			X
5:yes	X		X
5: no			
6.1		X	
6.2			
6.3			
6.4	VAN-SAT		DIRECT SOURCE
7: yes	X	X	X
7: no			
8.1			X
8.2			X
8.3			
8.4	X		
8.5	X	X	
8.6	X		

Question #:	Company P.1	Company P.2	Company P.3
8.7			
8.8			
9.1	X		
9.2	X		
9.3	X		
9.4			
9.5		X	X
9.6			
10.1			X
10.2	X		
10.3		X	
10.4			
10.5			
10.6			
10.7			
11: yes	X		
11: no		X	X
12: yes			
12: no		X	X
13: yes			
13: no		X	X
14: yes	X		
14: no			
15.1			
15.2			

Question #:	Company P.1	Company P.2	Company P.3
15.3			
15.4			
15.5			
15.6			
16.1 0-5 months	1 week		
16.2 6-12 months			
16.3 1-1.5 years			
16.4 1.5+ years			
16.5 has not occurred			
17: yes			
17: no			
18: yes	X		
18: no			
19.1 0-5 months			
19.2 6-12 months			
19.3 1-1.5 years			
19.4 1.5+ years			
20.1			
20.2			
20.3			
20.4			
20.5			
20.6			
21: yes	X	X	X
21: no			

Question #:	Company P.1	Company P.2	Company P.3
22.1	X	X	X
22.2	X		X
22.3			
22.4			
22.5			
22.6			
22.7			X
22.8			
22.9			
22.10			
23.1 0-5 months	X		
23.2 6-12 months			
23.3 1-1.5 years			
23.4 1.5+ years		X	
23.5 not yet			X
24: yes			
24: no	X	X	
25: no			
25.1 Transaction Time	X	X	
25.1a Inventory			
25.1b Cash Flow			
25.1c Costs	X	X	
25.2 Keying			
25.2a Errors	X		
25.2b Personnel	X		

Question #:	Company P.1	Company P.2	Company P.3
25.2c Costs		X	
25.3 Customer			
25.3a Service			
25.3b Sales	X	X	
25.4 Software/Hardware			
25.4a Purchase			
25.4b Modifications			
25.4c Maintenance			
25.5 Transmission			
25.6 Training for your Company	X		
25.6a In-house	X		
25.6b Purchased			
25.7 Training for your Trading Partners	X		
25.7a In-house			
25.7b Purchased			
25.8 Time Value Costs			
26	----------	----------	----------
26: no			
26.1 Transaction Time			
26.1a Inventory			
26.1b Cash Flow			
26.1c Costs			

Question #:	Company P.1	Company P.2	Company P.3
26.2 Keying			
26.2a Errors			
26.2b Personnel			
26.2c Costs			
26.3 Customer			
26.3a Service			
26.3b Sales			
26.4 Software/ Hardware Costs			X-COSTS OF STANDARDS TOO HIGH
26.4a Purchase			
26.4b Modifications			
26.4c Maintenance			
26.5 Transmission			
26.6 Training for your Company			
26.6a In-house			
26.6b Purchased			
26.7 Training for your Trading Partners			
26.7a In-house			
26.7b Purchased			
26.8 Time Value Costs			

VITA

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Candidate for the Degree of

Master of Science

Thesis: MEASURING THE EFFECT OF THE DEPARTMENT OF DEFENSE CONTRACTING PROCESS REQUIREMENT OF ELECTRONIC DATA INTERCHANGE ON THE DECISION TO BID PROCESS OF SMALL TO MEDIUM SIZED FIRMS IN OKLAHOMA

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OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 11-21-95 **IRB#:** EG-96-002

Proposal Title: MEASURING THE EFFECT OF THE DEPARTMENT OF DEFENSE CONTRACTING PROCESS REQUIREMENT OF ELECTRONIC DATA INTERCHANGE ON THE DECISION TO BID PROCESS OF SMALL TO MEDIUM SIZED FIRMS IN OKLAHOMA

Principal Investigator(s): Paul Rossler, Susan P. Hoefler

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

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Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature: John H. Wyckoff

Chair of Institutional Review Board

Date: November 28, 1995