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**ANALYSIS OF SMALL BUSINESSES'
PERSPECTIVE ON THE ELECTRONIC DATA
INTERCHANGE ACQUISITION REFORM**

by

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June 1997

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ON THE ELECTRONIC DATA INTERCHANGE
ACQUISITION REFORM

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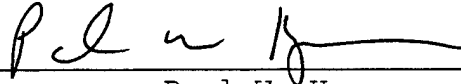
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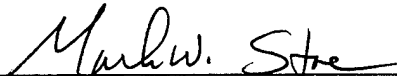
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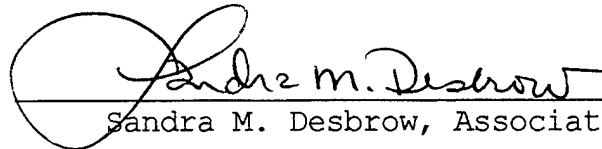


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ABSTRACT

This thesis examines small business' perception of utilizing Electronic Data Interchange (EDI) as a means to conduct business. The general concept and history of EDI is discussed along with a synopsis of current Government EDI systems in use. The results of two surveys are analyzed to provide an insight on the effect the Federal Acquisition Streamlining Act is having on small business' opportunity to obtain Government Contracts. Additionally, interviews were conducted with several Government personnel to get their opinions on the progress of EDI in the workplace.

The major conclusion drawn is that the majority of small businesses are willing to utilize EDI as a means to conduct business. But in its current form (i.e. FACNET) small businesses find it difficult to use and too expensive. The need to use a simpler and more cost-effective means is necessary to ensure that all small businesses have the opportunity to compete for Government contracts without cutting into their profit margins.

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I. INTRODUCTION

A. BACKGROUND

The Department of Defense (DOD) is undergoing significant change driven by world events, shrinking budgets, and pressure to reduce the cost of its acquisition, logistics and financial processes. Information technologies are particularly important to DOD streamlining its business functions without degrading military capability. [Ref. 1, pg. 1-1]

One way to accomplish this task is the use of Electronic Data Interchange (EDI). As EDI becomes more and more popular and the standard way of conducting business in both the private and public sectors, one needs to ask what does this mean for the Department of Defense and its customers.

By utilizing EDI in the acquisition process, the user will convert a repetitive manual process into one that is paperless. This paperless system offers the user the ability to transfer documents faster, more accurately, and at a lower cost than a manual system.

The Government is strongly pushing the use of EDI because it sees the use of EDI as the best method to force the implementation of acquisition reform. The Federal Acquisition Streamlining Act of 1994 (FASA) provides strong incentives for adopting EDI via the Government's Federal

Acquisition Computer Network (FACNET) or in some other form.

A major change that FASA made in the contracting environment was raising the simplified acquisition threshold from 25,000 dollars to 100,000 dollars. The simplified acquisition threshold enables procurement activities to streamline and reduce their paperwork requirements for many of their procurements that are between \$2,500 and \$100,000. The simplified acquisition threshold has another important function as stated in the Federal Acquisition Regulations (FAR);

Each acquisition (non-FACNET and FACNET) of supplies or services that has an anticipated dollar value exceeding \$2,500 and not exceeding \$100,000, is reserved exclusively for small business concerns and shall be set aside in accordance with Subpart 19.5. [Ref 2]

A small business is an organization that is typically "independently owned and operated and is not dominant in its field of operations." [Ref 3, pg. 3] Additionally, it needs to meet the numerical size standard established by the standard industrial classification (SIC) code that is assigned to the contracting opportunity.

Looking at the volume of contracting actions that are conducted by Government agencies, "transactions of \$25,000 and less are the majority (98 percent) of DoD's actions."

[Ref 4, pg. 1] With such a high percent of DOD's contracts falling within the simplified acquisition threshold, the use of EDI on these transaction offers an excellent opportunity for the streamlining. Additionally, as stated earlier these transactions are reserved for small businesses.

As EDI becomes the more prevalent means of conducting business, are the small business concerns keeping up with the changes or are they being left behind (or out) in the old way of conducting business with the Government?

B. OBJECTIVES

The primary thrust of this study is to discuss, analyze, and evaluate the use of Electronic Data Interchange (EDI) for procurements of less than \$100,000. This simplified acquisition threshold will allow procurement activities to streamline and reduce their paperwork requirements, but will it provide small businesses a more favorable atmosphere in which to compete? An analysis of this procurement practice is provided to determine if small businesses are being hindered or receiving benefits from this change.

C. RESEARCH QUESTIONS

To achieve the objective of this thesis, the following is the primary research question:

Are the changes from the Federal Acquisition Streamlining Act requiring the use of EDI for simplified acquisitions enabling small businesses a better opportunity to obtain Government contracts?

Subsidiary questions to answer the primary research question include:

What is EDI?

What are the advantages and disadvantages of using EDI?

What is the current guidance for Government agencies on the use of EDI?

What are the viewpoints of small businesses toward the use of EDI?

What type of standards exist to facilitate this process?

What resources are required by a small business to enable them to utilize EDI?

D. SCOPE, LIMITATIONS, AND ASSUMPTIONS

1. Scope

The scope of this thesis is limited to studying the affect of EDI acquisition reform. The focus is on small businesses' ability to compete effectively for contract awards from the Department of Defense.

2. Limitations

This study evaluates the effect the changes from the use of EDI for procurement actions of less than \$100,000 is having on small businesses. The researcher does not discuss the numerous technical issues that are involved with how EDI works.

3. Assumptions

The researcher assumes that the reader has some familiarity with the acquisition and contracting field. If the reader is unfamiliar with the acquisition process, they may need to refer to the Federal Acquisition Regulations (FAR) or other regulations that are appropriate. Chapters I and II contain a discussion on EDI to provide a basic understanding for those who are not familiar with its background and uses.

E. METHODOLOGY

The methodology of this thesis consisted of a thorough literature search and review, plus personal interviews with DOD and civilian personnel. Additionally, two surveys were conducted to obtain the small business perspective on what they are experiencing by the Government's use of EDI and possible recommendations.

F. DEFINITIONS AND ABBREVIATIONS

A List of acronyms used in this thesis is provided in Appendix A. The definition of terms and concepts is provided within the text as necessary.

G. ORGANIZATION OF STUDY

This research effort is organized into five chapters. The first chapter is the overview of the research being accomplished. Chapter II provides the reader with an overview of EDI. This includes what it is, its history, benefits, hardware/software requirements, and a basic description of its implementation and use.

Chapter III discusses current EDI systems in use and what these systems have to offer. Chapter IV presents the researcher's findings from conducting surveys and interviews. Chapter V provides the reader with a summary and the researcher's conclusion.

II. BACKGROUND

A. WHAT IS ELECTRONIC DATA INTERCHANGE?

EDI is an integral part of electronic commerce (EC), as is electronic mail (e-mail), bulletin boards, faxes, and electronic funds transfer (EFT) systems. "EDI is the computer-to-computer exchange of business documents in a standard electronic format." [Ref. 5, pg. 4-1] These electronic formats are transaction sets that have been developed and used by the private sector over the past 30 years.

By using electronic commerce techniques, businesses and Government agencies can exchange information electronically much faster, at a less expensive cost, and more accurately than a paper-based system. These advantages are discussed later in more detail.

EDI is different from sending information/messages via a network, bulletin board, or similar means. The use of networks requires that the sender and receiver agree upon a standard format prior to transferring information. Additionally, they need to have similar application software (i.e., word processors, spreadsheets, etc.). This standard format is necessary to ensure that both parties are able to read and interpret the data once it is received.

When using EDI, it is not necessary to have identical document processing systems. When information is

transferred, the EDI translation software converts the proprietary format of the sending organization into an agreed upon standard. Then when the information is received, EDI translation software will automatically change the standard format into a proprietary format compatible with the document processing system of the receiver.

B. HISTORY OF EDI AND THE GOVERNMENT

EDI was first used in the automobile industry and has since been incorporated by more than 50,000 private sector businesses in manufacturing, shipping, warehousing, utilities, pharmaceuticals, construction, petroleum, metals, food processing, insurance, retailing, health care, and textiles industries, to name a few.

Other uses of EDI include universities exchanging transcripts more rapidly, automobile manufacturers transmitting large, complex engineering designs created on specialized computers, and large multinational firms communicating between locations.

In 1968, a group of companies joined together and developed the first set of industry standards that were published in 1975. This group was called the Transportation Data Coordinating Committee (TDCC) and has been instrumental in promoting EDI since. "Many of these standards supported only intra-industry trading; but others

such as bills of lading and freight invoices, were applicable across industries." [Ref. 6, pg. 7]

"Eventually the idea of national standards for use across industries received substantial support from a number of different industries." [Ref. 6, pg. 7] The American National Standards Institute (ANSI) is the coordinating body and clearinghouse for national standards in the United States. ANSI does not generate new standards, but charters committees to develop them for approval by ANSI. One of these committees was labeled the Accredited Standards Committee (ASC) X12. ASC X12 was established to develop uniform standards for cross industry electronic communications.

The ASC X12 committee was made up of representatives from industrial and commercial organizations, and vendors of services designed to facilitate the use of Electronic Business Data Interchange Standards. ASC X12's function was to develop standards to facilitate electronic interchange of data relating to order placement and processing, shipping and receiving information, invoicing, and payment.

In 1983 ANSI published the first five American National Standards for EDI. In 1989, Release 4 contained 32 standards. The 1991 publication (Version 3, Release 2) will contain over 100 Draft Standards for Trial Use, including most of the transportation and retail industries' standards, and there are over 150 additional standards and guidelines now in development. [Ref. 6, pg. 7]

The Federal Government has endorsed the standards developed and maintained by this committee because they have been used in the private sector and were developed in compliance with ANSI rules. By using these standards, the Government has built on the success of private industry.

ANSI ASC X12 is the most important set of EDI standards in North America. Another standard that is used in EDI is the United Nations sponsored EDI standard, Electronic Data Interchange for Administrative, Commerce, and Transport (EDIFACT). The objective of the establishment of UN/EDIFACT was to create an EDI standard that will be valid for use across international boundaries and similar to ANSI ASC X12. UN/EDIFACT is primarily used in Europe and Asia, but has worldwide applications. In order to benefit from a single global standard, ANSI ASC X12 and UN/EDIFACT will begin a gradual alignment in 1997.

The Government entered the realm of modern EDI in 1988, when the Deputy Secretary of Defense issued a memorandum to the Department of Defense (DOD) calling for maximum use of EDI. This course of action was based on ten years of investigation and experiments concerning DOD EDI usage.

In the memorandum, it was stated that EDI initiatives moving toward a paperless environment were consistent with DOD's commitment to improved productivity. It also stressed the timely, effective, and consistent

implementation of EDI between DOD and industry, and designated the use of ASC X12 EDI standards to provide a common approach to implementation and a single coordinated DOD position to industry. [Ref. 7, pg. 1]

In 1990, the Defense Management Review Decision (DMRD) 941 accelerated the use of EDI within DOD. "The strategic goal of DOD's current efforts is to provide the department with the capability to initiate, conduct, and maintain its external business related transactions and internal logistics, contracting, and financial activities without requiring the use of hard copy media." [Ref. 8, pg. 1]

In addition, DMRD 941 programmed cost reductions into the DOD's budget. The greatest potential for the projected savings was in the procurement/contract administration and payment/financial areas. These cost savings identified by DRMD 941 were based on converting sixteen common purchasing and logistic forms into EDI format. The following are the forms identified by DMRD 941:

DD 250	Material Inspection and Receiving Report
DD 1155	Order for Supplies and Services
DD 1898	Aviation Fuels Sales Slip
MT 364R	Standard Tender
SAV 926	Monthly Report, Receipt of Repairable
SF 18	Request for Quotations
SF 30	Amendment of Solicitation/Contract Modification
SF 129	Solicitation Mailing List Application
SF 364	Report of Discrepancy
SF 362	Transportation Discrepancy Report
SF 368	Product Quality Deficiency Report
SF 1103	Freight GBL, CBL, and Public Voucher
SF 1169	Government Travel Request and Public Voucher

SF 1203 Personal Property GBL
SF 1443 Contractor's Request for Progress Payments
619/619-1 Statement of Accessorial Services

In addition to downsizing, smaller budgets, and new technologies, procurement professionals and vendors must now incorporate the changes brought on by the Federal Acquisition Streamlining Act. In 1994, the Federal Acquisition Streamlining Act (FASA) was passed by Congress and signed into law by President Clinton. The major changes FASA made in the contracting environment were:

- Raised the simplified acquisition threshold from \$25,000 to \$100,000.
- Emphasized the acquisition of commercial items.
- Micropurchases (acquisitions less than \$2,500) are no longer small business set aside.
- Modified the bid protest process, decisions are to be more timely and the debriefings of unsuccessful offerors are to be more informative.
- Past performance considerations.
- Modified the Truth In Negotiations Act, raising the threshold of Cost and Pricing Data from \$100,000 to 500,000.
- Requires agencies to adopt EC/EDI procedures within five years.
- Established the Federal Acquisition Computer Network (FACNET).

Of these changes, the simplified acquisition threshold and the establishment of EC/EDI requirements and FACNET will be discussed here. The simplified acquisition

threshold enables procurement activities to streamline and reduce paperwork requirements for many of their procurements that are between \$2,500 and \$100,000. In addition, another incentive to make the move to EDI is any procurements that are between \$25,000 and \$100,000 that are issued and solicited using FACNET, will no longer be required to be synopsisized in the Commerce Business Daily. The only catch is the agency needs to be certified and are required to transmit 75 percent of their eligible transactions via FACNET by 31 December 1999 in order to retain the \$100,000 threshold. If the agency fails to meet this deadline, the threshold falls back to \$50,000. FASA does not define what eligible means, it has tasked the Comptroller General to report to the Administrator for Federal Procurement Policy and Congress on what types of contracts are not suitable and not eligible for EDI.

The Federal Acquisition Regulation defines eligibility as:

(a) Simplified acquisition procedures shall be used to the maximum extent practicable for all purchases of supplies or services not exceeding the simplified acquisition threshold (including purchases below the micro-purchase threshold), unless requirements can be met by using required sources of supply under Part 8 (e.g., Federal Prison Industries, Committee for Purchase from People Who Are Blind or Severely Disabled, and Federal Supply Schedule contracts), existing indefinite delivery/indefinite quantity contracts, or other established contracts.

(b) The contracting office shall not use simplified acquisition procedures for contract actions exceeding \$50,000 after December 31, 1999, unless the

office's cognizant agency has certified full FACNET capability in accordance with 4.505-2. [Ref. 9]

The Government is strongly pushing the use of EDI because it sees the use of EDI as the best method to force the implementation of acquisition reform. FASA provides strong incentives for adopting EDI via the FACNET. "To provide an incentive for adopting EDI, the DMRD gives Departments and DLA money to invest in hardware, operations, maintenance, systems development, and engineering." [Ref. 10, pg. 1-5] FACNET is discussed in more detail in Chapter III.

C. BENEFITS OBTAINED BY USING EDI

As EDI becomes more prevalent as a way of conducting business, the majority of business people are considering adopting EDI to gain or maintain an important customer or supplier. A 1994 industry survey found that 55 percent of the companies surveyed got into EDI because a trading partner required it. [Ref. 11] The definition of a trading partner "is a business that has agreed to exchange business information electronically." [Ref. 12, pg.1)

One may ask, what benefits will they receive by being a trading partner and using EDI? The following subsections provide an explanation of several benefits. [Ref. 13, pg. 2]

1. Improved Customer Satisfaction

Improved customer service is realized through the use of EDI. By speeding up the transfer of business information and the reduction/elimination of data errors, EDI allows contractors to process and fill orders faster than a paper based system. This faster turnaround enables managers to act on information with greater accuracy.

The ease of data transfer has been experienced by retailers that have implemented a program called Vendor Stock Replenishment (VSR). VSR requires vendors to maintain appropriate inventory levels in their stores. By using VSR, the risk of running out of product while waiting for a purchase order to be received is almost eliminated. Stock is sent as the EDI system reports it is necessary and clients are automatically billed for the product. This process reduces the duration of the order fulfillment cycle and ensures that the products are always available on the store shelves. Utilization of EDI for companies practicing just-in-time (JIT) inventory practices will be an essential tool of the future.

2. Saves Time and Money

As EDI transfers documents from one source to another (or even many), a reduction of administrative lead-time will occur. Also, there is no longer a need to have items mailed or handled by administrative work sections.

This allows Request for Quotations (RFQ) to be received immediately by the customers and respond to the RFQ.

On the Government side, another reduction in time will be obtained from not having to synopsise requirements less than \$100,000 in the Commerce Business Daily. This alone can save about fifteen days. As EDI is used more and more, the contracting process at Government agencies will improve and provide additional reductions in administrative lead-time. Upon the completion of the implementation of EDI in Government agencies, the time frame that a solicitation is open for quotation could be reduced.

In addition to the timesavings, EDI will drastically reduce paper consumption since information is being transferred from one computer to another. This reduction and transition from a paper-based system will reduce a business' operating cost in the long run and will then increase or preserve the company's existing revenues.

Additionally, the transfer of information from computer to computer is automatic, the chance for error drops to almost zero. By transferring information in this manner, EDI will decrease handling and mailing costs. This is evident by what RJ Reynolds has experienced with its use of EDI.

RJ Reynolds has 1800 trading partners with 60,000 purchase orders annually. In March 1993, they had achieved 100 percent electronic transactions with all trading partners. They had to make a special effort in working with the last five percent of their

suppliers that still processed transactions with RJ Reynolds manually. They had determined that it was costing the Company \$840,000 to maintain a manual capability for the remaining five percent of their non-electronic trading partners. RJ Reynolds invested \$40,000 to assist these companies in becoming EC capable. As a result, RJ Reynolds has been able to maintain 100 percent electronic commerce with all trading partners. RJ Reynolds reached these decisions through analysis of their manual-based processes costing \$98.00 per transaction, while their actual expenses for the same process is \$.93 for each electronic transaction. [Ref. 14, pg. 111]

EDI's ability to transfer data from computer to computer will also improve the user's payment process. When it is easier and faster to match and gather all the required payment data, the payment cycle will be shortened. In addition to the timesavings generated in the payment cycle, customers will benefit from the reduced time in mailing of payment documents.

3. Business Reputation

Using EDI, customers are able to access up-to-date information at anytime. This will then enhance the reputation that an organization has developed. EDI information can be stored in mailboxes which customers can access whenever they wish. Accordingly, they can obtain the information they require in a timely manner and at a time that is convenient to them. The timesavings obtained from not having to wait will increase customer's efficiency. This ability will form a stronger relationship between existing and future EDI users.

4. Expansion of Customer Base

Organizations conducting business via EDI will allow the access of their supplies, services, or information to many potential customers that are willing and able to utilize EDI to their benefit. EDI's computer to computer (electronic) proximity will replace an organization's physical (geographic) proximity to its customers. This then increases the national and global access to an organization.

Also, such visibility will expand a trading partner's market from two perspectives, access to a larger volume of items and access to more customers (e.g., DOD's procurement offices, other businesses). The increased visibility of Government/commercial requirements will increase the EDI user's ability to market its goods and services to additional organizations.

As the number of Government offices transition to the use of EDI, the visibility of purchase requirements will expand. Currently, a contractor's opportunity to be solicited by a government agency is limited to the agency's mailing list. So the contractor needs to ensure it is working closely with a number of agencies. With EDI, a contractor will be able to access the Government procurement system via a single point. This ability allows the DOD contractor greater opportunities to quote on and compete for Government contracts. Once awards are made,

the results will be posted and accessible via EDI. This information will allow contractors to improve their knowledge of competitors and prices. This information will be extremely helpful to help DOD contractors adjust to the declining DOD budgets and business base.

5. Increased Productivity

With the downsizing of commercial and DOD organizations, increased productivity of the remaining workforce is a must. EDI will allow the contract specialists the ability to process more Requests For Quotations/Proposals (RFQ/RFP) and contract awards. In a paper-based system, redundant operations like copying, mailing, handling, answering telephone calls, and data entry consume a lot of time. As organizations downsize, many tasks once handled by clerical staffs will be performed by the contract specialists. The use of EDI will eliminate many of these redundant activities and thus allow contract specialists more time to process more RFQs, RFPs, and awards in an efficient manner.

6. More Competitive Pricing

With more and more customers being aware of an EDI user's requirements through the use of EDI, competition will increase on items that have traditionally been procured by local sources around an organization's geographic area. EDI will allow all suppliers the same information no matter where they are located. So as

competition increases, the market pressures will begin to produce lower prices on commodities that are being procured.

7. Reduced Inventory

A final benefit is a reduction in required inventory levels. In a paper-based system, inventory requirements have additional quantities built into them to compensate for the longer administrative lead times (processing time). As EDI lowers the administrative lead times for procurements, the additional quantities added to procurements can be eliminated. This elimination will then lower the required inventory levels, which will in turn save on organization storage costs.

D. CONTRACTOR HARDWARE/SOFTWARE REQUIREMENTS

With the benefits available to potential EDI users, the next step is identifying the hardware and software required to use EDI. "The term enabling technology refers to the communications network, computer hardware and computer software requirements necessary for Trading Partners to engage in EC/EDI with DOD." [Ref. 15, pg. 6-1] In most cases, a standard personal computer system will do. There is not a particular brand required to be EDI capable. The majority, if not all, of the personal computers made within the past couple of years are capable of supporting the necessary EDI requirements, including the necessary EDI translation and communication software.

1. Hardware

"The objective of the EDI system is to enter specific EDI transaction data once and then transmit that data in a computer readable format throughout the complete EDI cycle." [Ref. 16, pg. 65] To become fully EDI capable, a trading partner needs to review the following when selecting computer hardware.

The major component will be the computer itself. Here the trading partner needs to evaluate what it will need today and tomorrow. This will be determined by what its expected transaction volume will be and how much it is willing to spend. There are basically four options to choose from; a mainframe computer, microcomputer as a front-end processor to a mainframe, a dedicated EDI operating system, and a stand-alone microcomputer.

a. Mainframe Computer

The mainframe computer will offer the trading partner faster processing time, connect the rest of the company together, and eliminate data entry since the rest of the company is attached and there is a single database. It also allows multiple users on the system at the same time via a local area network (LAN). There is a disadvantage however, the cost of the system is significant.

b. Microcomputer as a Front End Processor

This system utilizes a microcomputer to conduct all the EDI transactions. The data is stored on the mainframe and transferred to the microcomputer. It is then converted into EDI formats and transmitted to a trading partner.

The advantages of using this method are that it is faster than a stand-alone computer and the cost of the front-end processor is usually less expensive than mainframe software. The disadvantages are just the opposite, it is still more expensive than a stand-alone mainframe and it is slower than just using a mainframe computer.

c. Dedicated EDI Operating System

This system uses a mini-computer and specialized EDI software. The advantage of a dedicated system is that it allows the company to manage all of its EDI transactions. The drawback is that it can be expensive.

d. Stand Alone Microcomputer

The minimum approach to EDI is the use of a personal computer (PC). They are easy to install and relatively inexpensive, plus there is software to support EDI transactions. PCs do have several disadvantages. First, there is still a chance of data entry errors, since data is still manually inputted and clerical mistakes can occur. Second, the system is slower than the other three

systems. Another disadvantage is the limited volume capability. The PC can not match the abilities of a mainframe's speed and volume. Finally, the full advantages of EDI are not received. Such things as cost reductions from reduced clerical work and interfaces between other operating systems can not be achieved.

e. Small Business Needs

Most small businesses will be able to utilize a PC to accomplish their needs. The computer can be either an IBM compatible or a Macintosh. The personal computer selected should be compatible with EDI translation software. "Any EDI-capable system must include a basic computer, a monitor, a hard drive, random access memory or RAM, a floppy drive, and a modem." [Ref. 15, pg. 6-5] According to the Electronic Commerce Office, to be fully integrated for EDI, the minimum requirements in 1994 were to have a 486 computer with eight megabytes of RAM and 200 MB available on hard disk. A standard PC bought today comes with sixteen MB of RAM and one gigabyte (GB) or more of hard disk space.

Other considerations to look at are speed and cost. A PC with a 14.4, 28.8, or 33.6 BPS fax/modem is sufficient to handle all transmissions between trading partners. If necessary, the modem can easily be upgraded with a faster modem. The speed of the computer's processor is another factor. Currently, most computers have

processors of 100 megahertz (MHz) or more. The higher the MHz, the faster the computer will process information. A typical PC system will cost anywhere from \$1,600 to \$3,000, depending on the computer's capabilities. More expensive computing systems are available depending on what ones needs are.

2. Software

Once the decision on the hardware has been made, the software to run your system is required. Most new computer systems are outfitted with standard operating system software, but to use EDI you must have translation software to communicate with Government agencies or any other trading partner. To accomplish this, there are two options from which to choose: buy the required software or utilize the services of a Value Added Network (VAN).

a. Purchase of Software

There many commercial sources that offer EDI software. These sources are readily available and eager to sell their products. "The average costs will range from \$5,000 for microcomputer translators to \$25,000 for minicomputer applications." [Ref. 1, pg. 6-9]

There are basically three types of EDI translation software available: stand-alone, integrated EDI, and EDI/Server Gateway.

The software for stand-alone PCs provide the lowest cost, are user friendly, and easy to install.

However, they are less capable and the capability for expansion is low.

Integrated EDI software can be used on PCs and other platforms. This type of software provides the features as stand-alone software but at a higher cost. It offers the additional advantage of allowing the organization to integrate the EDI software with other software applications.

The last type of software, EDI Server/Gateway, is used on mainframes and mainframes with microcomputers serving as front-end processors. This software allows the greatest flexibility but has a higher cost and may require more time and expertise to use/maintain.

b. Value Added Networks

The second option to receive the software capability required is to go through a commercial contractor offering translation services for a fee. These are called Value Added Networks (VAN). A "VAN provides the communication skill, expertise, and equipment necessary to communicate electronically." [Ref. 15, pg. 5-3] The Value Added Services (VASs) provided by a VAN include statistical analysis, ADP services, translation, conversion/fax, bulletin boards, and E-mail. A customer will only be responsible for its own hardware.

Start up costs can run up to \$1,200 depending on the number of trading partners and VAN options selected.

VAN services are billed on a monthly basis and will run from \$50 to \$1,000 based on the monthly usage. The billing will include a charge for basic services, mailbox, network usage, and VAN interconnections. For most users, subscribing to a VAN to communicate with Government agencies is the most practical way. But for a small business, the cost may be high.

Advantages of using a VAN are:

- One toll free or local telephone call to a VAN connects you to your trading partners (Government agencies).
- Maintains your electronic mailbox, all of your messages are routed, stored, and forwarded from it.
- VANs are accessible seven days a week, 24 hours a day, regardless of physical location.
- VANS are very reliable; connecting with your trading partners will be accomplished with varying communication speeds and protocols.
- Security and technical support is provided. This includes audit trails for your transactions.

c. Software/Value Added Networks Selection

Software selection should be done carefully. A determination of software features that are required by an organization should be accomplished. The following criteria for selecting software or VAN should be followed:

- Communication capability, speed, and protocols supported.
- Batch transmission and scheduling capability.

- Permit connections to more than one VAN.
- Password and other security features.
- Document turnaround features.
- Trading partner profile table feature.
- Support for multiple versions of ANSI ASC X12 standards.
- Automated archiving and purging capability, data backup/recovery services.
- Mapping and application integration facility.
- Documentation and technical support, including audit trails. Has DOD certified them has VAN?

E. CONTRACTOR IMPLEMENTATION

As an organization decides to become EDI capable, the decision to start with a small system and work up to a more complex system may be desirable. This decision will depend on the size of the company. As mentioned before, a small system may be sufficient for a small business, but probably will not do for a large corporation. However, no matter what the size of the business is, the following steps should be considered as an organization moves forward with EDI.

- Commitment of management to recognize that EDI is a business strategy and not a technology strategy. Additionally, management leadership is required to make it a success.
- As mentioned before, EDI offers many benefits. Management needs to establish quantifiable business objectives and expectations with respect to new revenue, retained revenue, and cost reductions.

Without these objectives and expectations, management will not be able to determine if its decision to use EDI was the correct one. Management may also need to compare the cost of using EDI with something new in the future.

- Assess the current situation of the business. This entails determining the cost of the current paper-based system and the current capability for EDI.
- Conduct research to get as much information on EDI as possible. This includes identification of what else will be required to implement EDI, i.e. any external assistance.
- Develop an implementation plan that includes roles, responsibilities, deliverables, timelines, and budget.
- Once the implementation begins, it is necessary to manage the plan. By conducting frequent meetings to determine progress and any problems, the business can ensure the implementation is successfully accomplished.
- Upon the completion of implementing EDI, the results should be reviewed. Did the outcome meet the business expectations?

F. CHAPTER SUMMARY

This chapter has presented a lot of information on what EDI is, its history, how it can benefit an organization that uses it, its hardware and software requirements, and things to look for when implementing EDI. EDI is not some new technology that has just been developed; it has been around for more than 30 years and will probably be around for a lot longer in some other form that will be developed in the future.

As mentioned earlier, FASA is the key driving force towards EDI implementation. The Government and business users desire to achieve the benefits of improved customer satisfaction, savings in time and money, improved business reputation, expansion of their customer base, increased productivity, reduced prices by increased competition, and reduced inventory levels.

As the EDI initiative moves forward, small businesses will need to invest in technology that will make them EDI capable if they wish to conduct business with the Federal Government. For many businesses, a stand-alone personal computer will provide that capability.

III. GOVERNMENT EDI SYSTEMS

A. INTRODUCTION

In order for the Government to become EDI capable, they must develop a system that allows them to conduct business with their trading partners electronically. This chapter provides a brief discussion what FACNET is, its functions, and infrastructure. It also presents basic information on seven automated computing systems that are currently being used by the various components of DOD.

B. FEDERAL ACQUISITION COMPUTER NETWORK

The Deputy Under Secretary of Defense (Acquisition Reform) is developing the Federal Acquisition Computer Network for Government-wide use in contracting as a means of streamlining the Federal acquisition process, reducing the cost of commercial products, and expanding business opportunities for small and medium-size vendors. The Federal Acquisition Computer Network is a cornerstone of acquisition streamlining and reform in that it enables the Government to evolve from using a paper-burdened acquisition process to a process based on the electronic exchange of business information for small purchases ranging from \$2,500 to \$100,000. For DoD to achieve the goals of using the Federal Acquisition Computer Network, vendor participation is essential. [Ref. 17, pg. i]

The Administrator for Federal Procurement Policy, the head of the Office of Federal Procurement Policy (OFPP) is responsible for the overall policy direction and leadership of the FACNET program. FACNET is a computer-based source of information that is readily available to both Government

and private sector users. The use of FACNET will help the Government present a single face to industry, that is, transactions will look and be processed the same way from any agency that uses FACNET.

As mentioned in the proceeding paragraph, FACNET is a computer-based source of information. A buyer at a contracting activity using an automated procurement system will prepare and transmit solicitations electronically through FACNET's infrastructure. This includes the functions of translating the documents into standard EDI formats and passing the information to the VANS that are certified by the Government. These VANS then distribute the documents to vendors that have subscribed to their services in accordance with the vendor's business profile information. The vendor will then submit its quote/proposal back to the Government in the same manner. Once the buyer has made the decision of the winning proposal, a contract is sent to the vendor. In addition, a broadcast notice announcing the winning vendor is sent to the VANS for distribution.

Among its potential uses, FACNET is able to provide the following functions electronically [Ref. 18]:

- Provide widespread public notice of solicitations for contract opportunities issued by an executive agency.
- Receive responses to solicitations and associated requests for information.

- Provide public notice of contract award, which will include price.
- Receive questions in reference to solicitations.
- Issue contract orders to contractors.
- Make payments to contractors by bankcard, electronic funds transfer, or other automated methods.
- Archive data relating to each procurement action made using FACNET. This will enhance the quality of information available about the acquisition process.
- Allow convenient and universal user access through any point of entry.
- Employ nationally and internationally recognized data formats that serve to broaden and ease the electronic interchange of data.

In order for a contractor to become a FACNET trading partner with the Government, they need to be registered with the system. To help do this, the central contractor registry (CCR) was established as the central repository of registration information. This allows contractors to register once with the Government vice having to register with each individual Government agencies the contractor wishes to do business with.

In order for the Government to utilize and take advantage of the \$100,000 simplified acquisition threshold (SAT) past the 31 December 1999, Government contracting offices need to receive interim FACNET certification from the Director, DOD EC by that date. If an agency fails to receive this certification, the SAT falls to \$50,000. "As

of September 1995, the Director, DoD EC had certified 157 of the 3983 DoD contracting offices. As of November 5, 1996, 300 contracting offices have been certified." [Ref. 19, pg. 2] If the current rate of certification is maintained, DOD will fall short of having all of their contracting offices FACNET certified by the deadline.

Procurement documentation passes through FACNET every business day. Today FACNET links over 300 Federal buying activities. FACNET's design features two network entry points, through which all message traffic must flow. FACNET uses two network entry points (NEP) to provide redundancy in case of a failure. These entry points are located in Columbus, Ohio, and Ogden, Utah. "Currently, the Ogden, Utah, and Columbus, Ohio NEPs process 15,000 to 20,000 transactions per day. According to DISA, the electronic commerce processing nodes will be capable of processing 1.5 million transactions per day." [Ref. 20, pg. 14]

As FACNET continues to move forward, it appears that there are still obstacles to overcome. In a recent General Accounting Office (GAO) audit, "of 13 contracting offices reviewed, we identified 6 contracting offices that were interim FACNET certified but were not capable of performing the requirements for interim FACNET certification." [Ref. 20 Pg. 9] "Agencies and vendors have consistently cited the lack of clear leadership, direction, and adequate program

management governmentwide [sic] as major reasons for delays in problem resolution and implementation of FACNET." [Ref. 21, pg. 16]

As new technologies are developed and existing capabilities improved, FACNET may be transformed. In a telephone interview with Matt Nielson, NAVSUP-EDI, indicated the "FACNET that we know today will be different than that of tomorrow." [Ref. 22] The infrastructure of FACNET may remain the same, but the system used (i.e., Internet, VANs) to conduct business will be different.

C. AUTOMATED COMPUTING SYSTEMS

Along with FACNET, there are several EDI procurement systems in use to support contracting office procurement functions. These systems have been proposed by the DOD component that uses them. "The National Defense Authorization Act of FY 1996 (the Authorization Act) amends the Streamlining Act by allowing agencies to test alternative EC procurement methods or systems that are not contingent on full FACNET implementation." [Ref. 17, pg. 2]

DLA has two EDI programs in place which operate on the Standard Automated Material Management System (SAMMS) which is a computerized contracting system. These programs are the SAMMS Procurement by Electronic Data Exchange (SPEDE) and the Paperless Ordering Placement System (POPS).

Currently, DLA conducts approximately 70 percent of its business using EC/EDI systems. [Ref. 23]

SPEDE is a small purchase EDI program. Purchase requests are generated through SAMMS from item managers or military customers. These requests are then converted into RFQs and sent to potential suppliers. The suppliers then respond by using Government developed software. Contract award is then sent to the winning supplier, which in turn sends shipment and invoice information. All of this is done electronically.

POPS basically does the same thing, except it only places orders directly with the supplier that has been awarded a long-term indefinite delivery contract.

The Navy has two programs currently in use. The first system is the Integrated Technical Item Management Procurement (ITEMP) System. ITEMP is used by the Inventory Control Points (ICP) to procure spare parts and services to support Navy and Marine Corp units. ITEMP is menu driven which enables the buyer to tailor each acquisition's specific parts. The system will select clauses and other data based on the specific characteristics of the acquisition. The system will then use all this data to create solicitations and contracts that are ready to mail.

Additionally, synopsis and award data is automatically generated and electronically transmitted for publication in the Commerce Business Daily (CDB). ITEMP is also being tested to transmit procurement data among trading partners.

The Automation of Procurement and Accounting Data Entry (APADE) is used by the Navy's Fleet Industrial Support Centers (FISC). It is used in both large and small procurements. The "system screens purchase requests against existing contractual instruments with the system preparing a delivery order, where a vehicle exists, for buyer review and award." [Ref. 14, Pg. 29] The buyers need to generate solicitations and contracts for the remaining purchase requests. Solicitations can be addressed to specific suppliers to restrict the RFQs from being sent to every supplier on a Qualified Products List (QPL) or to a sole source supplier.

An Air Force system is the Government Acquisition through Electronic Commerce (GATEC). GATEC is capable of sending RFQs, contracts, and award summary information to suppliers and receiving quotes back from suppliers. GATEC can produce abstracts, solicitations, purchase and delivery orders, basic agreements, and contracts used for small

procurements. RFQs are posted with VANs for nation-wide viewing.

The Standard Automated Contracting System - EDI (SACONS-EDI) provides Army contracting offices using the Standard Army Automated Contracting System (SAACONS) with EDI capability. SACONS-EDI is an application interface between SAACONS and the EC/EDI gateway (VAN). It is a commercial off the shelf (COTS) package that allows the buyer to electronically send and receive solicitations, contracts and quotes. The buyer will use SAACONS to receive and review requirements, prepare and print solicitations, contracts, and modifications. The buyer then uses SACONS to post the requirements on a VAN (the General Electric Information Service), which allows potential suppliers the ability to browse and search for potential RFQs of interest. In order for a supplier to do this, they need to have QuickBid PC. This software package will allow the supplier to receive, process, and transmit electronic business transactions.

With the different EDI/EC systems currently in use, the Government has made it difficult for contractors to conduct business in the same manner between the various Government agencies. The Standard Procurement System (SPS)

which has been developed and scheduled for implementation to start in June 1997 will help correct that. "SPS has been identified by the Director of Defense Procurement and the DoD Procurement Corporate Information Management Council as the target system which will bring a common operating environment to DoD's procurement community."

[Ref. 24] SPS is intended to make it easier to conduct business with the Government by presenting "one face" to industry. Approximately 900 activities throughout the world will utilize SPS, making the core element of Government contracting a standard process. [Ref. 25]

SPS is designed to incorporate acquisition reform initiatives and DOD procurement processes with that of best commercial practices and new technology. Once SPS is implemented, cost and timesavings are anticipated from utilizing it. SPS is an integrated system that will be capable of the following functions that begin with the receipt of a requirement and ends with contract closeout:

[Ref. 26]

- Collecting the requirements.
- Determining the appropriate method for acquiring systems, supplies, or services.
- Soliciting and selecting sources.

- Awarding, reporting, modifying, terminating, and closing out contracts and other instruments.
- Inspecting and accepting systems, supplies, or services.
- Monitoring and administering quality assurance actions and programs.
- Production and engineering surveillance.
- Property administration.
- Determining amounts payable.
- Monitoring, approving, and tracking payments.

D. CHAPTER SUMMARY

As FACNET continues to move forward, changes will no doubt take place. FACNET will continue to evolve into a system that will enable the Government and its trading partners to take advantage of using EDI technology to conduct business. This may even include the use of the Internet to conduct business via a central homepage on the World Wide Web.

As with FACNET, the automated computing systems that are used by the components of DOD will be improved and changed. This can be seen by the development of the Standard Procurement System. The ability to use automated systems only improves the effectiveness of an organization. By continually improving and standardizing these systems, the Government's work force will receive the benefits of

modernization. Improved automated systems allow the buyers the ability to become a more efficient and effective worker. By having a standardized system, it also allows them the flexibility to transfer from one buying office to another.

FACNET and the automated computing systems are the means to disseminate information to many potential suppliers of Government requirements. FACNET is dependent on the ability of an organization to have the capability of being automated. The automated computing system will allow the contracting activity the means to process information more efficiently and accurately. While the use of FACNET will allow more vendors access, via the VANS, to the requirements that the Government has.

IV. SURVEY PRESENTATION/ANALYSIS

A. SURVEY METHODOLOGY

To accomplish this thesis, two surveys were conducted to obtain the perception of EDI by small business. The first survey (see Appendix B) was sent out by a DOD organization to 150 of its local vendors. The main goal was to determine why there was not a great response to attend their second EDI Vendor Conference in December 1996, following a very successful first conference a year earlier. A second survey (see Appendix B) was sent out by the researcher to obtain additional information that the DOD organization did not include in its survey. The California Procurement Training and Assistance Center (PTAC) was contacted to obtain a list of small businesses that are using or considering the use of EDI. Fifty additional surveys were sent to businesses on that list. Survey participants were selected on a random basis and all were geographically located in California, with the vast majority from the central California area. Survey participants were assured that their participation was strictly voluntary and their responses would remain confidential. At the conclusion of the survey data collection, 36 surveys had been returned for the first

survey and 16 for the second. The return rate was 24 and 32 percent respectively.

The questions for both surveys were organized into three general categories, which include general characteristics, EDI activity (use), and problems with using EDI. The second survey additionally included questions on costs and perceptions of EDI by businesses. The following sections will pertain to both surveys unless otherwise indicated.

B. GENERAL CHARACTERISTICS OF THE SMALL BUSINESSES

The following information deals with the socio-economic status, years of contracting experience with DOD agencies, and percentage of their business that is DOD contracts.

1. Socio-Economic Status

The socio-economic status of the businesses surveyed is displayed in Figure 1. The results were obtained from the second survey. Of the 16 respondents, four indicated they are a small business, four are 8(a) business concerns, two are woman-owned, and six are small disadvantaged. Also, seven of the 16 respondents indicated they are minority-owned.

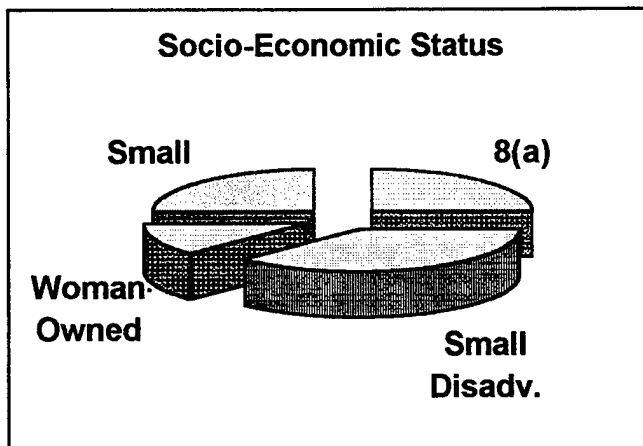


Figure 1. Socio-Economic Status

2. Contracting Experience With DOD

The surveyed companies have a wide range of experience when it comes to doing business with the Federal Government. This range is from zero to 70 years. This information was obtained from both surveys. Figure 2 displays this information.

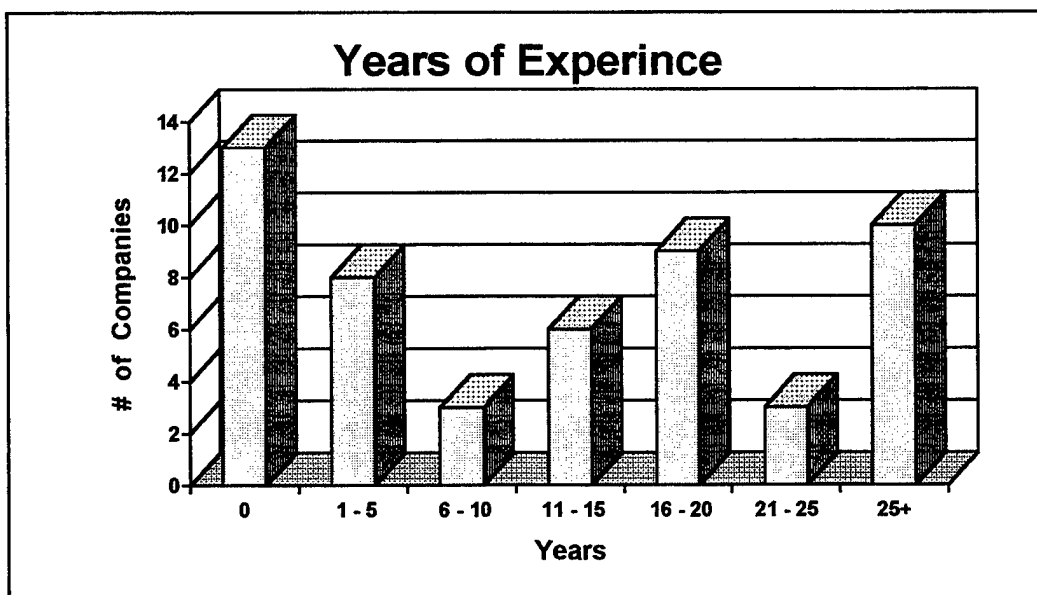


Figure 2. Years of Experience With DOD

3. Amount of DOD Business Conducted

The percentage of business the surveyed companies conduct with DOD is depicted in Figure 3. The survey indicates a large percentage of the small businesses conduct less than 20 percent of their total volume with DOD. Several businesses indicated that their business base with the Government was less than two percent.

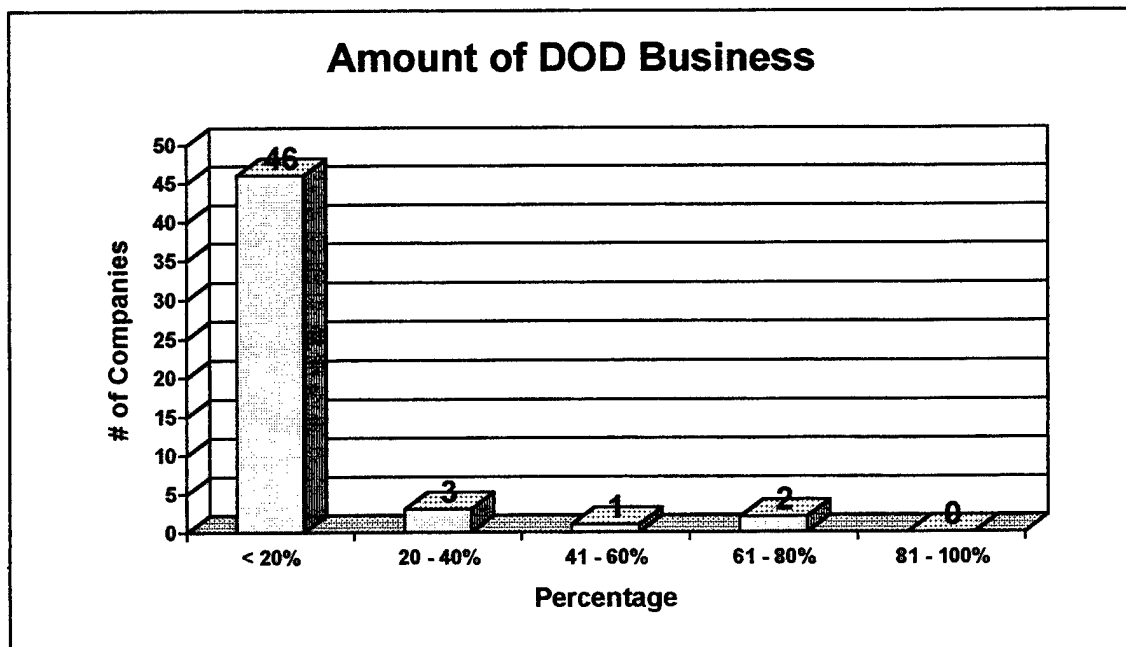


Figure 3. Amount of Business Conducted with DOD

C. EDI ACTIVITY

As the EDI initiative continues to move forward, the question that comes to mind is: are small businesses moving

with the rest of the business world in using EDI? This section presents the results of the surveys that indicate how much EDI is being used by small businesses.

1. EDI Capability

Of the 52 survey respondents, 21 are currently EDI capable and using it to some extent. Three of the 21 plan not to use EDI in the future. Out of the remaining 31 businesses, 17 plan to use it in the future. The remaining 14 businesses have no plans to use it. Five of the 17 businesses planning on using EDI in the future indicate they should be EDI capable within the year. Figure 4 displays these results graphically.

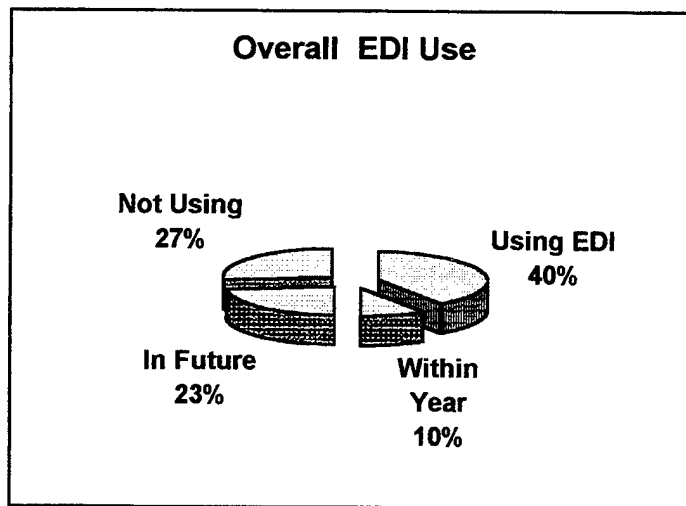


Figure 4. Overall EDI Use by Small Business

A 1989 Gallop Poll of businesses in the private sector, indicated that 17 percent of the companies polled used some form of EDI to conduct business. [Ref. 27, pg. 16-17] Comparing the Gallop data to these survey results indicates that during the past eight years, EDI use has increased.

Of the 21 businesses currently using EDI, 20 of them conduct less than 20 percent of their transactions utilizing EDI capabilities. Only one business has 20 to 40 percent of its transactions processed through this means. The volume of business transacted between trading partners is an important element when deciding on the use of EDI. Based on the research conducted, the more business one does with a specific trading partner, the more EDI will benefit both parties. By being required to use EDI, a small business needs to conduct more business via EDI to help offset the costs of the system and still maintain the same profit level.

For example, 7 of 12 vendors stated that their businesses were so small and their profit margins so limited that increased competition, as envisioned in using FACNET, could jeopardize their profit margins and their continued operations. In order for those vendors to be competitive under FACNET, their traditional 9- or 10- percent profit margin had to be reduced to about 3 percent, a level that would drive them out of business. [Ref. 17, Pg. 10]

Additionally, the respondents that are currently utilizing EDI are split on the view that it is a good investment. Out of the 21 businesses, 11 of them feel it is a good investment because it saves time and money, improves customer satisfaction, improves a business' reputation, helps expand their customer base, and because the Government is using it. The ten businesses that consider it a bad investment believe there are insufficient EDI sales/usage, start up and maintenance costs are too high, there are too many problems with the system, and it is inefficient.

The 14 businesses that plan not to use EDI in the future indicated that EDI is not useful to them or they are just not interested. They also indicated that the expense of EDI and training issues were a factor in not using it. EDI users share this opinion as well. The cost of EDI is discussed later in this chapter. The training issue is a major concern. Currently, the Federal Government funds Electronic Commerce Resource Centers (ECRCs), PTACs, Small Business Development Centers, and non-Government sources (i.e. VANS) to increase the awareness of FACNET and EDI issues. These organizations receive millions of dollars per year to provide information, training, and assistance

to small and medium size businesses wishing to implement EDI. The ECRCs receive the vast majority of these funds. Many small businesses will not know where to look for EDI help if not directed/informed. This should be accomplished by the contracting offices that use EDI. These offices should have an advocate that can direct and help businesses get in contact with organizations such as the ECRCs and PTACs. "In fact, only 10 of 54 vendors who were aware of FACNET learned about it through the Electronic Commerce Resource Centers." [Ref. 17, pg. 8] The effectiveness of organizations to convey EDI information, especially the ECRCs, is an area in need of further study.

2. Cost

Only five of the respondents revealed the amount they spent to become EDI capable. This cost of implementation ranged from \$1,000 to \$5,000. Even though the number of respondents for this question was low, it is consistent with a recent GAO report. This report indicated "that hardware and software costs generally range from \$2,100 to \$5,800, and VAN services generally include a start-up fee of up to \$1,200 and recurring monthly charges." [Ref. 17, pg. 10]

As mentioned in Chapter II, the use of a VAN reduces the amount that an EDI user needs to put up front to become EDI capable. However, it does cost money to use. Survey number two requested respondents to indicate if they used a VAN service. Three out of the five (or 60 percent) EDI capable businesses subscribed to a VAN. Their monthly service cost ranged from \$60 to \$200.

According to information provided by California PTAC, there are currently 27 VANs providing EDI support service. [Ref. 28] As mentioned above, their set-up costs range from \$50 up to \$1,899. In addition to this cost, monthly service cost range from \$35 to \$250. For a small business, the higher end of these scales makes it extremely difficult for them to afford. These cost are only the basic charges, many VANs charge additional fees per transactions, support costs, toll charges, and connection fees to other networks. Once all these cost are added up, the monthly bill can be in the thousands.

3. Transmission Problems

Once a small business is EDI capable, it needs to be able to conduct transactions without error or the feeling that its transactions are being lost. Three of 13 respondents indicated that they have experienced problems

when using EDI. These problems include constant network shutdowns, download problems and time, non-user friendly systems, poor VAN support, and lost transactions. When transactions are lost, this can then increase the cost of using EDI by having to retransmit additional documents and paying additional fees to the VANs.

Additionally, two of the three businesses using VAN support indicated that they do not receive adequate support from their VAN. If a problem arises, it takes the VAN ten days or more to correct the problem. An interesting point to this is that these two vendors pay a monthly service charge of \$200 while the third vendor only pays \$60 and is satisfied with the service. When choosing which VAN service to use, thorough research needs to be done by the business to ensure they receive the support that is desired.

If a business is to remain a going concern, this ten-day window is not satisfactory. A business can lose a lot of work by lost transactions and any other problems associated with the use of FACNET. In a recent audit by GAO, 14 of the 54 vendors surveyed that were familiar with FACNET identified specific technical problems related to the reliability of using FACNET. [Ref. 17, pg. 11] These

vendors indicated the following concerns with FACNET; adequate transmission feedback, transactions processed in a timely manner, and transmitting EC/EDI data. This information indicates that FACNET and the VANs supporting it need to become more reliable to ensure that the users are receiving the service that they are paying for and that they need to conduct business effectively.

D. EDI AND SMALL BUSINESS

Small businesses indicate that they are willing to use EDI in some form and that the Government has encouraged them to use it. But they feel that the Government does not have an effective system in place to communicate EDI issues with their suppliers. As mentioned earlier, the main advocate for EDI should be the Government agencies that are using it. They are the organizations that are in contact with many business concerns on a daily basis.

The respondents on the second survey indicated that Government personnel do not understand the demands faced by businesses using EDI. To help solve this, customer service is very important. The DOD agency that sent out the first survey is interested in providing this help, but the researcher believes that they do not go far enough. This is evident by how the survey was tailored to avoid

questions on the service they provide to their EDI trading partners. Their main concern was the low turn out for their second EDI vendor conference. In order to help business concerns, buying organizations need to understand where they need to make improvements.

Current businesses using EDI state that EDI has encouraged professional and business growth to some degree and that the Government's use of EDI has benefited them. In addition though, they state there are not enough alternative options of EDI available to them to make sound financial and business decisions. Since there is only one EDI alternative available, they can not explore what is the most cost-effective way to do business. The only choice they have is to become EDI capable to conduct business with the Government or not to do business with the Government at all.

Finally, an interesting viewpoint of the respondents of the second survey is that they are concerned about the uncertainty of EDI in future plans of the Government. As with any program that the Government implements, there always seems to be the chance it will be cancelled or just drift to the wayside. EDI implementation, however, will continue to move forward. This is necessary in the state

of reduced budgets and down sizing. For the Government to continue to meet budgets and to increase efficiency and productivity, new and streamlined ways of conducting business must be implemented. The use of EDI technology will be one of these methods that will be used.

E. CHAPTER SUMMARY

The use of EDI is to help automate the process of doing business with the Government so that all business concerns can be players in Government contracting. However, the surveys conducted indicate that this is not happening. What is happening or evident by the surveys is that small businesses that have experience with Government contracting are finding it too costly to conduct business using EDI. So if the benefits of using EDI are out weighed by the cost, many small businesses may be inclined not to use it in the future.

The main issues that face FACNET users are the costs, lack of training and support, and transmission problems. The success of EDI implementation is dependent upon the actions of the Government. The Government needs to implement a system that will meet all of the users needs and expectations. This system also needs to be easy to use

and allow a business to make sound decisions at the earliest possible time.

One has to wonder if the Government is undermining its own socio-economic programs by using EDI. One of the Government's goals is to promote competition at all levels and still maintain socio-economic programs. If EDI is too costly for many small businesses to implement and use, then the competition for contracts that are set aside for small businesses is being restricted.

The advance in computer technology is not going to dissipate in the future nor is the movement to streamline the Government procedures and practices. Businesses at every economic level must be confident in the Government's decision to implement EDI. The implementation of EDI should help build a bridge into the 21st century.

V. CONCLUSION AND RECOMMENDATIONS

A. CONCLUSION

As EDI initiatives continue to move forward, many will be asking why should I convert from my current way of doing business to EDI? As shown in the previous chapters, EDI has many benefits to offer to anyone that uses it. Although, the most important reason to switch over is the fact that EDI will be the standard way of conducting business in the future.

The simplified acquisition procedures provide Government agencies with an incentive to continue with the implementation of EDI systems. As the Government continues to implement and use EDI, contractors that once sold material and services to the Government may begin to lose potential business in the future. As more commodities and services valued under \$100,000 are posted using EDI methods, it will become increasingly difficult to compete against contractors that are EDI capable.

With more and more businesses beginning to use new EDI technology, the Government is again lagging behind the commercial sector. EDI implementation still has a long way to go. DOD needed 350,000 FACNET EDI capable contractors by the end of 1996. Currently, there are only about one-

seventh of that number. As the EDI initiative moves forward, it will continue to challenge both the Government and its contractors.

For many of the smaller businesses, however, FACNET is not a viable option. The cost of implementing and using the current Government system is just not cost effective for them to use. One Government objective of EDI is to increase the visibility of agency needs and at the same time increase price competition. This has occurred, but at the same time it is squeezing out many small businesses' ability to compete. As more and more businesses compete to do business with the Government, the competition that is generated will cause vendors to quote prices as low as they can. In doing so, the profit margins of the contractor winning the award, will be drastically reduced. This can then cause contractors not to compete or to start losing money by bidding low and not covering the cost of using EDI.

"Organizations with the most success in using EDI technology for purchasing, however, typically use it to transmit high-volume, routine, and repetitive transactions, such as delivery orders under existing contracts and invoices, with a small group of known suppliers." [Ref. 21,

pg. 5] This tends to indicate that in order to remain profitable, small businesses need to increase their use of EDI and have a high business volume with the Government. Small businesses that are more established and financially secure may be able to accomplish this if they sell the right product/service.

The typical small business will not experience this high volume of business. For example, a business for a single month can experience the following EDI volume. Using the bid match service provided by VANs, a business could receive 200 potential matches to their profile. The bid match service matches a business' profile (kind of work they are looking for) to potential RFP/RFQs that are advertised through FACNET or some other form of EDI. Out of those 200 hits, 55 solicitations are received; the remaining hits are notices of award or some other form of documents. The business will then submit 35 proposals on work that they have the capability of performing. Out of those proposals, they will receive three contracts for work. [Ref. 28] This is only an 8.57 percent chance of receiving work on proposals submitted or a 1.5 percent chance for all bid match documents.

The percentage of success is extremely low and the results of the bid match and receiving only three contracts does not provide for high volume transactions using EDI. The Federal Government is trying to capitalize on the success of the commercial success in using EDI. The major difference is in a commercial scenario, a company has only a few well-established trading partners, while the Government is trying to interact with many.

For small businesses competing for procurements that are valued less than \$100,000, there must be some form of EDI in place that will provide an equal opportunity for any business concern to receive a contract from the Government. By making small business contractors pay for VAN services and computer hardware, many will lose this opportunity because their profit margins will not be able to cover the additional costs incurred. Additionally, the more competition there is, the lower vendors will have to bid to ensure they have a chance of award. By doing this, they again cut into their profit margins making EDI that much more unattractive.

Unless it is the intention of the Government to restrict competition by using EDI as the tool to limit the amount of suppliers with which the Government does

business, other methods of EDI need to be used to conduct business with small businesses.

B. RECOMMENDATIONS

A review and evaluation of the research conducted indicates EDI is and will continue to be a valuable tool for the Government to utilize in streamlining its procurement process. The following recommendations have been formulated to help promote full and open competition among small businesses wishing to compete for contract awards.

1. Use of the Internet

The first and most effective option is the use of the Internet. In today's atmosphere of computer technology, the Internet provides small businesses with a means to conduct business. The use of the Internet would be more cost-effective than using a VAN service. The cost to use an Internet service provider can be as low as \$15 per month, which is much cheaper than the cost of a VAN service and many businesses already pay for this service to have E-mail and market research capabilities.

The Government needs to pursue this concept and create a central homepage on the World Wide Web to list its requirements for material/services. The Internet would

allow a business to make timely business decisions and compete effectively for its products. The Government would still benefit and receive lower prices from increased competition.

2. Use of a Single Government Site as a VAN

This option would require the Government to design, develop, and implement the services required by Government trading partners and provide the service to small businesses for free or a minimal fee. The Government would need to compete against established VAN service providers or at least outsource this concept to an established VAN.

The use of a single Government site as a VAN would benefit small businesses by not having to pay high VAN fees, but it does have its disadvantages. These include higher costs to the Government, software must be developed, and the Government would be in direct competition with commercial VANs.

C. ANSWERS TO RESEARCH QUESTIONS

To achieve the objective of this thesis, the following primary research question was addressed:

Are the changes from the Federal Acquisition Streamlining Act requiring the use of EDI for simplified acquisitions enabling small businesses a better opportunity to obtain Government contracts?

The use of EDI in Government procurement enables small businesses to have a more ready access to Government requirements that are processed via EDI. However, the cost of implementing and using FACNET EDI technology hinders small businesses in becoming EDI capable. This hindrance then limits the opportunity of small businesses to obtain Government contracts as FACNET continues to move forward.

To answer the primary question, the following subsidiary questions were addressed.

1. What is EDI?

EDI is an integral part of electronic commerce (EC), as is electronic mail (e-mail), bulletin boards, faxes, and electronic funds transfer (EFT) systems. EDI is the computer-to-computer exchange of business documents in a standard electronic format. Chapter II provides a generalized discussion of EDI.

2. What are the advantages and disadvantages of using EDI?

EDI can provide an organization with many benefits. These benefits include but are not limited to; improved customer satisfaction, a savings in time and money, improved business reputation, expansion of customer base, increased productivity, more competitive pricing, and reduced inventory levels.

There are disadvantages that are not advertised as much as the benefits are. As indicated in Chapter IV, the costs for small businesses outweigh the benefits that are received. There are complaints of server downtime, lost transactions, and basically, EDI is not user friendly for someone that does not employ computer experts. Many small businesses only employ a handful of people, and these people serve in multiple roles. A small business may not have the financial capability to hire someone to do its computer processing.

3. What is the current guidance for government agencies on the use of EDI?

The Government is strongly pushing the use of EDI because it sees the use of EDI as a method to help in the implementation of acquisition reform. FASA provides strong incentives for Government agencies to pursue EDI implementation and use. FACNET is the primary system that the Government is pursuing. There is some doubt about its effectiveness though. The future look for FACNET may or may not be what is presently envisioned. As new technologies and capabilities are developed, FACNET will have to evolve into something different.

Additionally, the National Defense Authorization Act of 1996 allows agencies to test alternative EDI/EC

procurement methods or systems. These systems include the use of internet, bulletin boards, and software programs. Currently, SPS has been identified by the DOD as the next generation software to bring us into the twenty-first century.

4. What are the viewpoints of small businesses toward the use of EDI?

Small businesses indicate that they are willing to use EDI as a business method and the Government has encouraged them to do so. EDI has encouraged professional and business growth to some degree. However, they do believe that Government personnel do not understand the demands faced by small businesses using EDI. Finally, there is some concern of the uncertainty of EDI in future plans of the Government.

5. What type of standards exist to facilitate this process?

The Federal Government has endorsed the EDI standards established and maintained by ANSI. ANSI ASC X12 is the most important EDI set of standards in North America. By utilizing these standards, the Federal Government receives the benefit from a readily accepted standard and they can build on the success of private industry. Chapter II discusses these standards in more detail.

6. What resources are required by a Small Business to enable them to utilize EDI?

Chapter II provides general requirements that a contractor needs to conduct business via EDI. For a small business to become EDI capable, a personal computer is the minimum required. A company will need start up costs of approximately \$2,000 - \$5,000 to purchase hardware, this cost depends on the type system purchased. Any EDI-capable system must include a basic computer, a monitor, a hard drive, random access memory or RAM, a floppy drive, and a modem. According to the Electronic Commerce Office, to be fully integrated for EDI, the minimum requirements in 1994 were to have a 486 computer with eight megabytes of RAM and 200 MB available on hard disk.

In addition to the hardware, software costs can range from \$5,000 to \$25,000 if software is purchased from a commercial source. A small business can avoid those costs by subscribing to a VAN. This can have a start up cost of up \$1,200 and monthly service cost ranging anywhere from \$50 to \$1,000 based on monthly usage.

D. AREAS OF FURTHER RESEARCH

Research conducted for this thesis has revealed the following areas of further research:

- Perform an analysis on a Government activity that has converted to EDI and compare the benefits, effectiveness, and costs of EDI to that of the paper-based purchasing system.

- Perform an analysis on a small business that has converted to EDI and compare the benefits, effectiveness, and costs of EDI to that of the paper-based purchasing system.
- Identify the impact and effectiveness that the Government training centers for EDI/EC initiatives (i.e., ECRC, PTAC) are having on helping small businesses to become EDI capable.
- Investigate and analyze the potential of using a single world wide web site to conduct simplified acquisitions.

APPENDIX A

LIST OF ACRONYMS

ADP	Automated Data Processing
ANSI	American National Standards Institute
APADE	Automation of Procurement and Accounting Data Entry
ASC	Accredited Standards Committee
BPS	Bits Per Second
CBD	Commerce Business Daily
CCR	Central Contractor Registry
COTS	Commercial of the Shelf
DD	Defense Depot
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DMRD	Defense Management Review
DOD	Department of Defense
EC	Electronic Commerce
ECRC	Electronic Commerce Resource Centers
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administrative, Commerce, and Transport
EFT	Electronic Funds Transfer
E-mail	Electronic Mail
FACNET	Federal Acquisition Computer Network
FAR	Federal Acquisition Regulations
FASA	Federal Acquisition Streamlining Act
FISC	Fleet Industrial Support Center
GB	Gigabyte
GAO	General Accounting Office
GATEC	Government Acquisition through Electronic Commerce

ICP	Inventory Control Point
ITEMP	Integrated Technical Item Management Procurement System
JIT	Just-In-Time
LAN	Local Area Network
MB	Megabytes
MHz	Megahertz
MT	Material Transportation
NAVSUP	Navy Supply Systems Command
NEP	Network Entry Point
OFPP	Office of Federal Procurement Policy
PC	Personnel Computer
POPS	Paperless Ordering Placement System
PTAC	Procurement Training and Assistance Center
QPL	Qualified Products List
RAM	Random Access Memory
RFQ	Request For Quotations
RFP	Request For Proposals
SAACONS	Standard Army Automated Contracting System
SACONS	Standard Automated Contracting System
SAMMS	Standard Automated Material Management System
SAT	Simplified Acquisition Threshold
SF	Standard Form
SIC	Standard Industrial Classification
SPEDE	SAMMS Procurement by Electronic Data Exchange
SPS	Standard Procurement System
TDCC	Transportation Data Coordinating Committee
UN	United Nations
VAN	Value Added Network
VAS	Value Added Service
VSR	Vendor Stock Replenishment

APPENDIX B

ELECTRONIC DATA INTERCHANGE SURVEYS

This appendix presents the cover letters and surveys that were sent out to businesses to help in the analysis of small businesses' perception of EDI. The first survey, is from a DOD organization to their vendors. The second survey was sent out by the researcher to business's that received assistance from the California Procurement Training and Assistance Center (PTAC).

A. COVER LETTER FOR SURVEY #1

30 January 1997

MEMORANDUM FOR GOVERNMENT SUPPLIERS

From: XXXXXXXX

To: Distribution

Subj: ELECTRONIC DATA INTERCHANGE (EDI) QUESTIONNAIRE

Encl: (1) Survey questionnaire

1. Request you complete enclosure (1) to help XXXXXXXX determine the usefulness and applicability of using EDI with our vendor base. The questionnaire is being distributed to a random number of our suppliers.

2. In December 1996, XXXXXXXX scheduled an EDI Vendor Conference. The purpose of the conference was to increase our EDI vendor base thus allowing us to further utilize the EDI as the preferred means of conducting business. However, due to low vendor response, the conference was cancelled. We are interested in the reason for the poor response and would like to research our vendor's perception of EDI

3. Your participation is strictly voluntary, and your responses will remain confidential. Your completed questionnaire is to be sealed in the enclosed envelope and returned to the designated individual at our activity.

4. Survey results will be used to determine whether XXXXXXXX should attempt another EDI vendor conference, evaluate our own use of EDI as a procurement tool, and identify and technical or software problems that exist. To help make good use of this information, please respond by 14 March 1997.

5. Your candid responses to the survey questions will be greatly appreciated. If you have any questions on the matter, please contact me at (XXX) XXX-XXXX.

B. SURVEY #1

Instructions

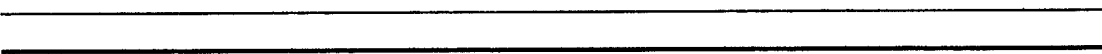
As stated in the cover letter, this survey is part of a study in Electronic Data Interchange (EDI). The questionnaire should take about 15 minutes to complete. The findings will be used to evaluate XXXXXXXX's use of EDI. All responses will remain anonymous.

Please answer each question as honestly and directly as possible. The format for most questions asks you to rate a statement using one of the rating choices and make any comments that are applicable in the space following the questions. Please circle the statement that most closely matches your opinion, more than one opinion may apply for certain questions. Don't limit your answers to the space provided, please use additional sheets if necessary.

After completing the survey, place the survey in the attached envelope and return it to:

XXXXXXX
XXXXXXX
XXXXXXX
XXXXXXX

All surveys must be completed and returned to the above address by 14 Mar 97. Thank you for your input and participation.



1. How many years have you worked with the Department of Defense activities? _____ years
2. What type of business is your company?
3. What percentage of your business are military contracts?

<20% 20-40% 41-60% 61-80% 81-100%

4. Did your business know about our EDI vendor conference that was scheduled in December 1996?

Yes No

5. If yes, why did you decide not to attend the conference? Circle as many that apply.

- EDI is not useful to my business
- Already using EDI
- Logistic problems (timing, location, etc.)
- Was not interested
- Other (please specify)

6. Would you like to attend an EDI vendor conference in the future?

Yes No

7. Is your business EDI capable?

Yes No

8. If yes, what percentage of your business is transacted using EDI?

<20% 20-40% 41-60% 61-80% 81-100%

9. If you are not currently using EDI, do you plan to use EDI in the future?

Yes No

10. Please explain your answer to question 9.

11. If you are already using EDI, do you consider it a good investment?

Yes No

12. If you answered no to question 11, why do you consider if a bad investment? Circle as many that apply.

Start up costs
Software, hardware or electronic maintenance cost
Insufficient EDI sales or usage
Too many problems in the system
Inefficient
Other (please specify)

13. If you are already using EDI, are you experiencing data transmission or other software problems?

Yes No

14. If yes, please explain the problems:

15. What frequency do the above problems occur (per week)?

0-1 2-5 6-10 11-15 >15

16. Are there any other non-technical problems using EDI? (i.e.; lack of human interaction hindering good communication)

17. Other comments are welcomed.

C. COVER LETTER FOR SURVEY #2

22 March 1997

Memorandum

From: LCDR Paul Hagen
To: Distribution

Subj: ELECTRONIC DATA INTERCHANGE (EDI) SURVEY

Encl: (1) Survey Questionnaire

1. Request you complete enclosure (1) to help in the analysis of using EDI for procurement transactions with small business concerns. The questionnaire is being distributed to a random number of suppliers.
2. I am currently working towards a Master in Science degree at the Naval Postgraduate School in Monterey, CA. The purpose of this survey is to conduct independent research and analysis of a subject in the acquisition and contracting field. I am interested in your opinion in the utilization of EDI for Government procurements.
3. Your participation is strictly voluntary, and your responses will remain confidential. Your completed survey is to be folded, stapled so the self-addressed portion on the back of the survey is visible, and returned to the designated individual.
4. Survey results will be included in my thesis and used in the analysis of the effectiveness of using EDI for simplified acquisition procedures. It will also help show if small businesses are receiving a fair and reasonable opportunity to bid/propose on Government contracts. To help make good use of this information, please respond by 15 April 1997.
5. Your candid responses to the survey questions will be greatly appreciated. If you have any questions on the matter, please contact me at (408) 899-1343.

Sincerely yours,

Paul W Hagen

D. SURVEY #2

Instructions

As stated in the cover letter, this survey is part of a study on Electronic Data Interchange (EDI). In this context, EDI is defined as the computer-to-computer exchange of business documents in a standard electronic format. The questionnaire should take about 15 minutes to complete. The findings will be used to evaluate the Government's use of EDI. All responses will remain anonymous.

Please answer each question as honestly and directly as possible. The format for most questions asks you to rate a statement using one of the rating choices and make any comments that are applicable in the space following the questions. Please circle the statement that most closely matches your opinion, more than one opinion may apply for certain questions. Don't limit your answers to the space provided, please use additional sheets if necessary.

After completing the survey, fold and staple the survey so the self addressed stamped portion is visible and please return it to:

LCDR Paul Hagen
238 Ardennes Circle
Seaside, CA 93955

I need to have all surveys back by 15 April 1997 to allow for data analysis. Thank you for your input and participation.

1. How many years have you been marketing to the Department of Defense agencies? _____ years

2. What is your company's socio-economic status?

Small Disadvantaged
Minority-Owned
Women-Owned
8(a)
Small

Small Other (please specify)
Large

3. What percentage of your business are military contracts?

<20% 20-40% 41-60% 61-80% 81-100%

4. Is your business EDI capable? Yes No

5. If yes, what percentage of your business is transacted using EDI?

<20% 20-40% 41-60% 61-80% 81-100%

6. If you are not currently using EDI, do you plan to use EDI in the future?

Yes No

7. In reference to question 6, Why or why not?

8. If you are already using EDI, do you consider it a good investment?

Yes No

9. If yes, why do you consider it a good investment?

Improved customer satisfaction
Saves time and money
Improved reputation in the business community
Expansion of customer base
Other (please specify)

10. If you answered no to question 8, why do you consider if a bad investment?

Start up costs
Software, hardware or electronic maintenance cost
Insufficient EDI sales or usage

Too many problems in the system
Inefficient
Other (please specify)

11. How much money have you invested in the implementation of EDI?

12. If you are already using EDI, are you experiencing data transmission or other software problems?

Yes No

13. If yes, please describe the problems:

14. What frequency do the above problems occur (per week)?

0-1 2-5 6-10 11-15 >15

15. Do you utilize a Value Added Network (VAN)?

Yes No

16. If yes, do you receive adequate help and service from your VAN?

Yes No

17. If you use a VAN, what is the average monthly costs?

18. How long does it take to correct a problem with your VAN?

1 day 2-3 days 4-5 days 6-10 days >10 days

19. If you are not using a VAN, what other form(s) of EDI are you using?

20. Are there any other non-technical problems using EDI?
(e.g.; lack of human interaction hindering good
communication)

21. If you are currently using EDI and experiencing
problems, do you feel that your business is negatively
impacted? (i.e. financial, reputation)

22. Other comments are welcomed.

The following questions should be answered by circling the
most appropriate answer. The corresponding numbers equate
to the following:

- 1 - Strongly Disagree, 2 - Mildly Disagree, 3 - Disagree,
- 4 - Agree, 5 - Mildly Agree, 6 - Strongly Agree,
- 7 - No Opinion

23. Government personnel
understand the work demands faced by 1 2 3 4 5 6 7
your business in utilizing EDI.

24. Government encourages the use of 1 2 3 4 5 6 7
EDI across all components of a
supplier's business.

25. Government has an effective system
of communicating EDI issues to their 1 2 3 4 5 6 7
suppliers.

26. A primary value of using EDI is
to strive for user satisfaction. 1 2 3 4 5 6 7

27. The Government works to anticipate
problems associated with EDI. 1 2 3 4 5 6 7

28. The Government places an emphasis
on utilizing EDI to conduct all 1 2 3 4 5 6 7
procurement transactions.

29. Suppliers can count on getting the support and resources needed to implement EDI to conduct business with the Government. 1 2 3 4 5 6 7
30. A mechanism is in place to help or give feedback to the Government suppliers regarding the use of EDI. 1 2 3 4 5 6 7
31. Government suppliers receive adequate information on specific contract requirements via EDI. 1 2 3 4 5 6 7
32. The Government understands the needs of their external suppliers Using EDI. 1 2 3 4 5 6 7
33. The Government provides suppliers with options concerning EDI that allows them to make sound financial as well operational decisions. 1 2 3 4 5 6 7
34. The Government offers their suppliers training opportunities to develop the skills and knowledge to keep current with their procedures and policies concerning EDI. 1 2 3 4 5 6 7
35. My training and experience with EDI has encouraged my professional and business growth. 1 2 3 4 5 6 7
36. Suppliers are concerned about the uncertainty of EDI in future Government practices and policies. 1 2 3 4 5 6 7
37. Suppliers feel the Government's use of EDI has benefited my business. 1 2 3 4 5 6 7

Thank you for your assistance.
Please return the survey as soon as possible.

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