ISSN 1512-1232

MODES OF ELECTRONIC COMMERCE: REAL ISSUES AND CASES

Dr.S.S.Riaz Ahamed
Principal, Sathak Institute of Technology, Ramanathapuram, Tamilnadu, India.
Email:ssriaz@ieee.org, sssriaz@gmail.com

Abstract

The need to exchange information is critical within the business community. The information may be generic in nature, such as a purchase order or invoice, or specific to an organization, such as a customs declaration. Traditionally, companies have exchanged this information by mailing preprinted business forms. In electronic commerce, this exchange of information takes place electronically. By integrating computers and data communications into the business process, companies can reap the benefits of exchanging information electronically: reduced paperwork, minimized cost, and improved response time.

1.1 Introduction to EDI

Problem Addressed by EDI

Companies have used paper as the traditional medium for conducting business. Company records are filed on paper, and paper forms are mailed between companies to exchange information. The advent of the business computer has enabled companies to process data electronically; however, the exchange of this data between companies still relies heavily on the postal system. Oftentimes, a company will enter data into a business application, print a form containing the data, and mail this form to a trading partner. The trading partner, after receiving the form, re-keys the data into another business application. Inherent in this process are poor response times - use of the postal system can add days to the exchange process, excessive paperwork for both companies involved in the exchange, and the potential for errors as information is transcribed.

EDI

Electronic Data Interchange (EDI) is the electronic exchange of business documents in a standard, computer-processable, universally accepted format between trading partners. EDI is quite different from sending electronic mail message or sharing files through a network, or a bulletin board. In EDI, the computer applications of both the sender and the receiver, referred to as Trading Partners (TPs) have to agree upon the format of the business document which is sent as a data file over an electronic messaging service. Put simply, EDI is about doing business and carrying out transactions with trading partners electronically. EDI covers most things that are done using paper based communication, for example placing orders with suppliers and carrying out financial transactions. This is why the term `paperless trading' is often used to describe EDI.

More formally EDI is described as the interchange of structured data according to agreed message standards between computer systems, by electronic means. Structured data equates to an unambiguous method of presenting the data content of a document, be it an invoice, order or any other document type. The method of ensuring the correct interpretation of the information by the computer system is defined by the standard. Electronic exchange of information in the context of pure EDI effectively means without human intervention.

Thus, EDI is the exchange, between organizational entities, of computer-processable data in a standard, structured format or syntax. Because of this format or syntax, electronic documents can be transmitted from one computer application to another without manual re-keying. The software, which handles the restructuring of the EDI message at each end of the transmission, is called EDI translation software.

ISSN 1512-1232

NEED FOR EDI

As noted above, companies and organizations that make a commitment and investment to integrate EDI into their systems and processes soon reap the rewards of increased responsiveness, greater competitiveness, and improved operating results. Maximum benefits are achieved when business processes are redesigned and streamlined at the same time. Those companies and organizations choosing a minimum EDI solution will, at the very least, retain a customer or trading partner. This scenario occurs when an important trading partner or business account mandates that EDI will be used to exchange business documents. In this case, the choices are to go in for EDI or lose the business to another supplier. Cost is an important factor when it comes to do business. Whether it's holding down internal expenses or the cost of outside suppliers who helps to do business, everything revolves around improving productivity and/or reducing costs. One way to reduce expenses, is to lower the cost of doing business with other businesses. As an example, the costs associated with writing, designing, publishing, printing, and distributing catalogs are well known, however that's not the whole picture. Consider also the buyer's expenses. Frequently, the information you produce must be transferred from a hard copy catalog to another form that is deemed to be more effective to them. Commonly, this would involve manually "re-keying" the data you have prepared for them into a database.

Now we have a situation that wastes time (and therefore money) for both parties . Today's business basics dictates that every company must repeatedly ask itself, "are we using our assets/resources in the most efficient manner possible?" Using the example above, the answer is definitely "no".

This is where EDI becomes a key business aid. By utilizing a standardized format (agreed to by the principles involved) that is based on an internationally recognized standard, the transmission of business documents is faster, at lower cost, with fewer errors. Without doubt, the foreknowledge of what is to arrive (a message in a standard syntax or structure) can only lend itself to a maximum of preparedness and as a result, efficiency. The implementation of EDI is sometimes found to be "cost prohibitive" because of start-up costs. Unfortunately, this reflects only short term thinking. The range of EDI translation products available to the consumer encompasses everything from a few hundred dollars, to tens of thousands of dollars. There is an affordable solution for your business and its needs; you need only invest a little of your time to find it. It does cost money to make money, but EDI usually pays for itself in savings through increased efficiency in an exceptionally short period of time. This doesn't even cover the added benefit many people experience when they are able to acquire a new trading partner simply because they are EDI capable (there are many businesses that will only do EDI-no paper). As a result, EDI can honestly be looked at as a simple and effective method of improving productivity and responsiveness.

1.2 Importance of EDI

Because of the different approaches in the development and implementation of EDI, there is no consensus on a definition of EDI. A review of some of the prevailing definitions follows:

Electronic data interchange is the transmission, in a standard syntax, of unambiguous information of business of strategic significance between computers of independent organizations.

Electronic data interchange is the interchange of standard formatted data between computer application systems of trading partners with minimal manual intervention.

Electronic data interchange is the electronic transfer, from computer to computer, of commercial and administrative data using an agreed standard to structure an EDI message.

ISSN 1512-1232

Electronic data interchange is the electronic transfer from one computer to another of computer processable data using an agreed standard to structure the data.

Another aspect of EDI that often causes confusion is its usage in one context as a technological solution that focuses on the mechanical transport and assembly of business forms and in another context as a business methodology that focuses on the content and structure of forms. Examining the layered architecture of EDI can clear this confusion.

1.3 History of EDI

Although the business computer enabled companies to store and process data electronically, companies needed an expedient method to communicate the data. This method was realized by the widespread use of computer telecommunications. Using telecommunications, companies could transmit data electronically over telephone lines, and have the data input directly into a trading partner's business application. These electronic interchanges improved response time, reduced paperwork, and eliminated the potential for transcription errors. Computer telecommunications, however, only solved part of the problem.

Early electronic interchanges were based on proprietary formats agreed between two trading partners. Due to differing document formats, it was difficult for a company to exchange data electronically with many trading partners. What was needed was a standard format for the data being exchanged.

In the 1960's a cooperative effort between industry groups produced a first attempt at these common data formats. The formats, however, were only for purchasing, transportation, and finance data, and were used primarily for intra-industry transactions. It was not until the late 1970's that work began for national Electronic Data Interchange (EDI) standards. Both users and vendors input their requirements to create a set of standard data formats that:

- were hardware independent;
- were unambiguous, such that they could be used by all trading partners;
- reduced the labor-intensive tasks of exchanging data (e.g., data re-entry); and
- allowed the sender of the data to control the exchange, including knowing if and when the recipient received the transaction.

Although today there are much syntax for EDI, only two are widely recognized: X12 and the Electronic Data Interchange For Administration, Commerce, and Transport (EDIFACT). These two families of standards are mandated for use within the Federal Government .

The early developers of EDI came from the transportation industry - ocean, motor, air and rail carriers and the associated shippers, brokers, customs, freight forwarders, and bankers. In 1975, the first set of industry EDI standards were coordinated and published by the Transportation Data Coordinating Committee (TDCC) and consisted of 45 transaction sets (EDI messages) for the transportation industry.

The current national, public EDI standard known as ASC X12 is based on the syntax design developed by TDCC and the transportation industry. As a result of the EDI success enjoyed in the transportation industry, many others, including shipping, retail and grocery, apparel manufacturing and textiles, warehousing, aerospace, chemicals, construction, automotive, electrical, electronics, utilities, finance, health care, petroleum, metals, and paper endorsed the ASC X12 standards and began to exchange EDI transmissions. A feasibility study in the grocery industry in 1980, for example, concluded that $200 to $300 million in annual savings in the industry would be available by using EDI.

ISSN 1512-1232

1.4 Working Method of EDI

In simplified form, the steps in the exchange of an EDI message are as follows. Assume that the originator (buyer) is sending a purchase order to the recipient (supplier):

Step 1 - The information required in the body of the purchase order will be provided in one of two ways. First, it may be entered into a file via data entry screens for subsequent processing by the EDI translation software. Second, the information may reside in computer application data files in which case it may be extracted and reformatted (mapped) into a file for processing by the EDI translation software.

Step 2 - The EDI translation software provides compliance checking to ensure conformance with EDI standards and trading partner implementation guides and translates the message into EDI format.

Step 3 - Communications software, under the control of the EDI translation software, establishes a communications connection to transmit the EDI purchase order. Usually, this involves dialing the telephone number of an electronic network (Value Added Network - VAN). Alternatively, direct connections are sometimes established between trading partners.

Step 4 - The computer file containing the EDI purchase order is transferred to an electronic mailbox, usually on a VAN, for subsequent pick-up by the intended trading partner recipient.

Step 5 - The trading partner's software retrieves the EDI message containing the purchase order from the electronic mailbox and presents it to EDI translation software. The EDI translation software interprets the EDI message, checks it for compliance, and stores it in a computer file for further processing.

Step 6 - The EDI translation software at this point normally sends a Functional Acknowledgment back to the sender's electronic mailbox. A Functional Acknowledgment is roughly equivalent to a Return Receipt from the Postal Service - it indicates that the message was received and whether it was compliant or not with the EDI standard.

Step 7 - The computer file containing the interpreted incoming EDI purchase order can now be employed in one of two ways. First, it can be used by the EDI translation software to produce a paper copy of the purchase order on a local printer. Second, the data in the file can be restructured by software (mapped) into the format required by a computer's application data files and then imported into those application data files.

Thus, the idea behind EDI is very simple. EDI seeks to take what has been a manually prepared form or a form from a business application, translates that data into a standard electronic format, and transmits it. At the receiving end, the standard format is “untranslated” into a format that can be read by the recipient’s application. Hence output form one application becomes input to another through the computer-to-computer exchange of information. The result is an elimination of the delays and the errors inherent in paper-based transactions.

Benefits of EDI can be seen by comparing the flow of information between organizations before and after its implementation. For this purpose the purchasing application provides an ideal scenario. In general, EDI has been used extensively in the procurement function to streamline the interaction between the buyer and seller. Other uses for EDI are also prevalent. Universities use EDI to exchange transcripts quickly. Auto manufacturers use EDI to transmit large, complex engineering designs created on specialized computers. Large multinational firms use EDI to send on-line price catalogs to customers listing products, prices, discounts, and terms. EDI-capable businesses can compare prices and terms and make direct orders by EDI.

Figure 1.1 shows the information flow when paper documents are shuffled between organizations via the mailroom. When the buyer sends a purchase order to a seller, the relevant

ISSN 1512-1232

data must be extracted from the internal the seller after passing through several intermediate steps. Sellers receive information in the form of letters and in some cases a vast number of facsimiles. This information is manually entered into the internal information systems of the recipient by data entry operators. This process generates a considerable amount of overhead in labor costs and time delays. The reproduction of information also increases the risk of errors caused by incorrect data entries.

This pervasive practice of converting digital data into hard copy data that is reconverted into electronic information again on the receiving end generates unnecessary costs. It is quite possible to exchange the information in its electronic format by means of other carriers. Such carriers include magnetic tapes and diskettes and, more recently, the EDI third-party services. The use of EDI carriers saves substantial administration costs by eliminating the bulk of circulating paperwork. Furthermore, the accessibility of the information is improved manifold, which enables more efficient audit of the operations.

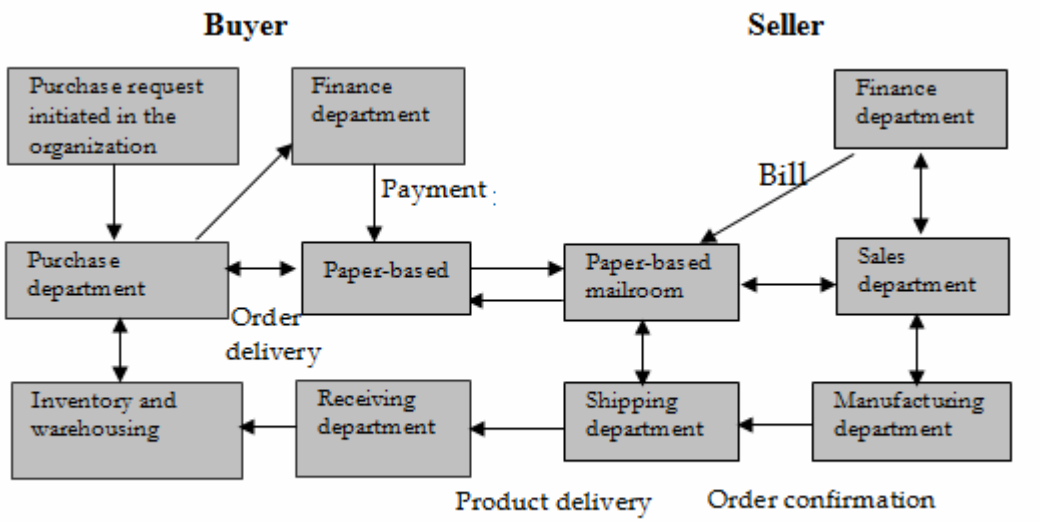

Fig 1.1 Information flow without EDI

EDI can substantially automate the information flow and facilitate management of the business process, as illustrated in Fig 1.2. The EDI transaction for a purchase, shipment, and corresponding payment are as follows:

Step 1. Buyer's computer sends Purchase Order to seller's computer.
Step 2. Seller's computer sends Purchase Order Confirmation to buyer's computer.
Step 3. Seller's computer sends Booking Request to transport company's computer.
Step 2. Transport company's computer sends Booking Confirmation to seller's computer.
Step 5. Seller's computer sends Advance Ship Notice to buyer's computer.
Step 6. Transport company's computer sends Status to seller's computer.
Step 7. Buyer's computer sends Receipt Advice to seller's computer.
Step 8. Seller's computer sends Invoice to buyer's computer.
Step 9. Buyer's computer sends Payment to seller's computer.

ISSN 1512-1232

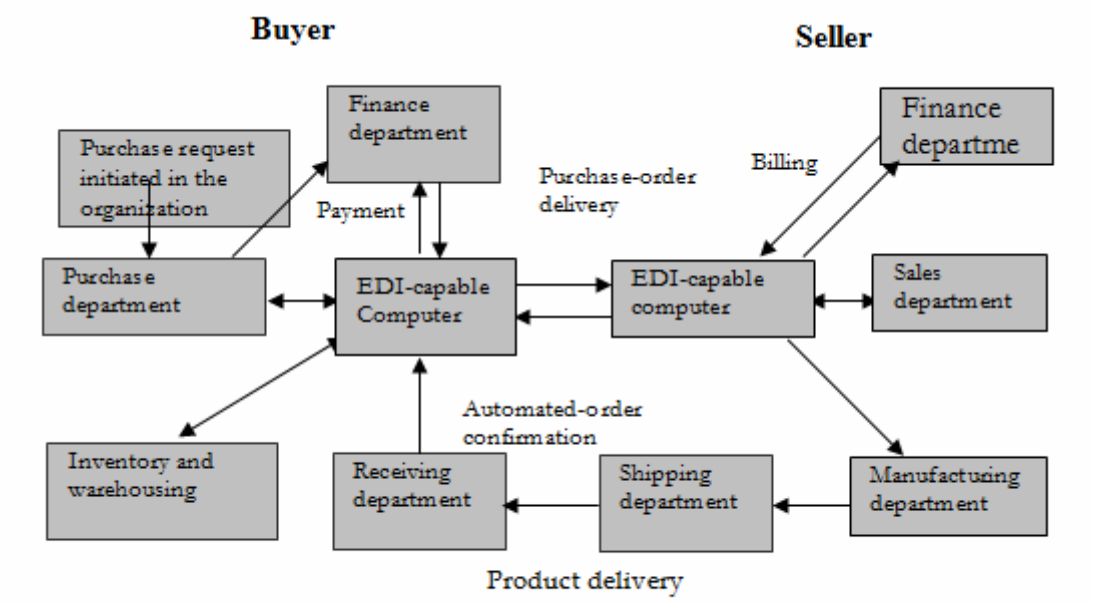

Fig 1. 2 Information flow with EDI

The Purchase Order Confirmation is the seller's acceptance of the price and terms of sale. Note that the various internal departments are aggregated and called buyer and seller to simplify the description. All the interactions occur through EDI forms and in most cases are generated automatically by the computer.

Thus, if data is entered once into the buyer's computer system and transmitted electronically, the same data gets entered into the seller's computer, without the need for re-keying or re-entry. This is normally referred to as application-to-application EDI. EDI can be fully integrated with application programs. This allows data to flow electronically between trading partners without the need for re-keying, and between internal applications of each of the trading partners.

The repeated keying of identical information in the traditional paper-based business communication creates a number of problems that can be significantly reduced through the usage of EDI. These problems include:

- Increased time
- Low accuracy
- High labor changes
- Increased uncertainty.

EDI consists of standardized electronic message formats for common business documents such as Request for Quotation, Purchase Order, Purchase Order Change, Bill of Lading, Receiving Advice, Invoice, and similar documents. These electronic transaction sets enable the computer in an organization to communicate with a computer in another organization without actually producing paper documents. It thus eliminates the human effort required to read, sort, and physically transport such documents. The documents for which standard EDI formats are either in existence or under development, constitute about 85% of the official communications associated with commercial transactions among business, government, educational institutions, and nonprofit establishments in most of the industrialized world. It is estimated that in the developing countries also, the preponderance of these documents is in similar proportion.

To take full advantage of EDI's benefits, a company must computerize its basic business applications. Trading partners are individual organizations that agree to exchange EDI transactions. EDI cannot be undertaken unilaterally but requires the cooperation and active participation of trading partners. Trading partners normally consist of an organization's principal suppliers and wholesale customers. Since large retail stores transact business with a large retail stores transact

ISSN 1512-1232

business with a large number of suppliers, they were among the early supporters of EDI. In the manufacturing sector, EDI has enabled the concept of Just-In-Time (JIT) inventory to be implemented. JIT reduces inventory and operating capital requirements.

To summarize, firms are adopting EDI as a fast, inexpensive, and safe method of sending invoices, purchase orders, customs documents, shipping notices, and other frequently used business documents. We can think of EDI as a strategic tool that enhances the competitiveness of the companies involved. The improved ability to exchange huge amounts of data in a fast and effective manner tends to speed up business processes. Furthermore, these processed can be closely monitored, providing the companies with the ability to trace, manage, and audit the operations. Such flexibility allows firms to adopt business techniques aimed at removing the bottlenecks and making the business processes more efficient.

1.5 EDI Layered Architecture

EDI architecture specifies four layers: the semantic (or application) layer, the standards translation layer, the packing (or transport) layer, and the physical network infrastructure layer.

The EDI semantic layer describes the business application that is driving EDI. For procurement application, this translates into requests into requests for quotes, price quotes, purchase orders, acknowledgments, and invoices. This layer is specific to a company and the software it uses. In other words, the user interface and content visible on the screen are tailored or customized to local environments.

The information seen at the EDI semantic layer must be translated from a company-specific form to a more generic or universal form so that it can be sent to various trading partners, who could be using a variety of software applications at their end. To achieve this, companies must adopt universal EDI standards that lay out the acceptable fields of business forms. What complicates matters is the presence of two competing standards that define the content and structure of EDI forms: the X12 standard, developed by the American National Standards Institute (ANSI), and EDIFACT, developed by United Nations Economic Commission for Europe (UN/ECE), Working Party for the Facilitation of International Trade Procedures.

To facilitate the computer applications of both sender and receiver use a compatible format for EDI document exchange. The sender must use a software application that creates an EDI file format similar to what the recipient's computer application can read. It is not mandatory that both have identical file processing systems. When the trading partner sends a document, the EDI translation software converts the proprietary format into a standard mutually agreed on by the processing systems. When a company receives the document, their EDI translation software automatically changes the standard format into the proprietary format of their document processing software so that the company can manipulate the information in whatever way it chooses to.

EDI standards layer specify business form structure and to some extent influence content seen at the application layer. For instance, a purchase order name field in an X12 standard might be specified to hold a maximum of 50 characters. An application using 75-character field lengths will produce name truncation during the translation form the application layer to the standard layer. In short, the EDI standards and application level, although separate, are closely intertwined.

EDI semantic layer	Application level services	
EDI standard layer	EDIFACT business form standards	
	ANSI X12 business form standards	
EDI transport layer	Electronic mail	X.435, MIME
	Point to point	FTP, TELNET
	World Wide Web	HTTP
Physical layer	Dial-up lines, Internet, I-way	

Fig 2.3 EDI layered architecture

ISSN 1512-1232

The EDI transport layer corresponds closely with the non-electronic activity of sending a business form from one company A to company B. The business form could be sent via regular postal service, registered mail, certified mail, or private carrier such as United Parcel Service (UPS) or simply faxed between the companies. In other words, the content and structure of the form are separated from the transport carrier. More and more, the EDI transport carrier of choice is becoming e-mail. Here, EDI documents are exchanged rapidly over electronic networks using the existing e-mail programs and infrastructure.

EDI document transport is far more complex than simply sending e-mail messages or sharing files through a network, a modem, or a bulletin board. These EDI documents are more structured then e-mail and typically are manipulated or processed more than e-mail messages by the sending and receiving software.

The relationship between EDI and e-mail can be ambiguous as e-mail systems become very sophisticated and incorporate more and more form-based features (see Table 1.1). A good example is Lotus Notes, which started as a simple form-based mail system but has evolved into a very sophisticated environment. Lotus Notes lack flexibility, however, and require trading partners to use the same software application at both ends. This goes against the EDI goal of openness.

Table 1.1 EDI Versus e-mail

Electronic Data Interchange (EDI)	Electronic Mail
There is typically no human involvement in the processing of the information, as the interface has software-to-software orientation. The data are structured in a software-understandable way.	The data are not necessarily structured to be software-understandable. A human-to-software interface is involved at least at one end of the interchange.
The interchange is composed by one software for interpretation by another software. If a reply is involved, it is composed by a software to be interpreted by another software.	The message is composed by a human and/or interpreted by a human and /or reply is composed by a human and /or interpreted by a human.

What really differentiates EDI from messaging is its emphasis on the automation of business transactions conducted between organizations. In addition, EDI messages have certain legal status. For instance, if a buyer sends a supplier EDI purchase orders that specify the requirements, time of delivery, and quantity and the supplier does not uphold its end of the contract, it can be taken to court with the EDI trading agreements serving as evidence. Table 1.1. indicates some EDI properties which distinguish it from e-mail.

The EDI physical layer denoted the physical components involved in the electronic exchange of information. It includes the dial-up lines, Internet and Information superhighway.

1.6 CommerceNet Advocacy

It is the leading industry consortium dedicated to the growth of Internet commerce. The consortium looks itself as acting as a prototype for an open. CommerceNet is a not-for-profit market and business development organization, with the mission of accelerating the growth of Internet commerce and creating business opportunities for its members. The organization focuses on precompetitive global and industry wide issues, so that members can benefit from economies of scale and avoid competing on an ineffective basis. CommerceNet operates as a virtual organization, relying heavily on the expertise and resources of its members as well as other industry associaltions.

The members of CommerceNet includes

a. leading US computer companies

ISSN 1512-1232

b. VAN
c. Telcos
d. On-line services.
e. Money center banks.
f. Credit card processors.

Activities and Goals of CommerceNet:

- Advocacy: promoting a legal and regulatory environment that fosters global commerce. CommerceNet engages businesses and governments in a constructive dialogue on issues such as trade, tariffs, taxation, privacy, and copyrights.
- Business outreach: Providing business decision makers with real-time knowledge to assist them in developing their Internet commerce strategies. CommerceNet provides executive briefings, seminars, conferences, and consulting services.
- Vertical industry solutions: Jump-starting key e-commerce by linking communities of interest involved in vertical market segments such as financial or health care services, manufacturing supply chains, or retail inventory management.
- E-commerce infrastructure (E-co Systems): Defining an open architecture and populating it with interoperable network and e-commerce services from multiple vendors that enhance the basic reliability, performance, and security of the Net and provide essential services such as payments, directories and EDI.

Features:

- With co-ordination of its members, Commerce Net is now developing elements of infrastructure model for future support of web commerce.
- The first definitive survey documenting about the growth of internet marketplace is produced by CommerceNet during the year 1996 in partnership with Neilson.
- It took active participation in forming the Internet startups that includes cyber cash, I/Pro, Internet shopping Network, Netscape, Open Market, Saqqara and Terisa systems.
- CommerceNet demonstrated the first security and payment protocols for the WWW paving the way for secure transactions.
- It also developed and distributed Internet starter kits for both users and service providers.
- It organized more than 10 pilots to demonstrate the bottom-line potential of Internet commerce.
- The examples includes:
- Online RFQ bidding service for the electronics industry.
- A secure-online system for filing with-holding tax information.
- The exchange of EDI payment instructions and confirmations over the internet.

Today, e-commerce is at a critical juncture. After an exhilarating start-up phase, further development hinges on bridging the chasm between early adopters and a true mass market. CommerceNet has identified four synergistic goals to ensure a successful transition:

- Developing the infrastructure to support mass-market Internet-based commerce on a global scale.
- Jump-starting key vertical markets
- Engaging businesses in many more industries and geographic regions
- Creating a conducive legal and regulatory environment.

CommerceNet is helping the industry converge on a standard architecture by endorsing key protocols and APIs and certifying the conformance and interoperability of its members' products. It is also organizing global communities of interest around important vertical markets. A tenet of CommerceNet's vision is that e-commerce should be open, not just to all buyers and sellers, but to

ISSN 1512-1232

the numerous providers of software and value-added services that support and lubricate the market-place.

CommerceNet does most of its work through its task forces, SIGs(special interest groups), and chapters. They each have specifice milestones and deliverables and require substantial and commitments of time and resources from participants. R&D is performed by CommerceNet Laboratories, a virtual organization staffed primarily by researchers employed at academic and industrial institutions. CommerceNet Labs also hosts a repository of contributed technology and sponsors grand challenge problems to stimulate further development of the Web and e-commerce in areas such as meta data and distributed searches, intelligent agents, and shared collaborative environments.

1.7 Conclusion

Open EDI provides a less-expensive alternative to electronic commerce than traditional EDI systems based on proprietary protocols and closed user groups. For most consumers, web-based commerce will be more visible; for businesses, Internet systems will initially at least supplement EDI. The lowering of barriers to entry into electronic commerce in general and web commerce in particular will make it economically feasible for many new businesses to enter the market. Specifically, interoperability will lower barriers to entry by increasing the number of participants in electronic markets, thereby lowering the cost per transaction.

1.8 References

1. Sheehy, D. E. 2002. Discussion of An experimental examination of alternative forms of web assurance for business-to-consumer e-commerce. Journal of Information Systems (Spring Supplement): 55-57.
2. Shields, M. G. 2001. E-Business and ERP: Rapid Implementation and Project Planning. John Wiley & Sons.
3. Anderson, P. and E. Anderson. 2002. The new e-commerce intermediaries. MIT Sloan Management Review: 53-62.
4. Kleindl, B. 2003. Strategic Electronic Marketing: Managing E-Business, 2e. South-Western Educational Publishing.
5. McCue, S. 2004. *Building E-Commerce Strategies: From Farce to Force*. South-Western Educational Publishing.
6. Davis, J. 2000. A Guide to Web Marketing: Successful Promotion on the Net. UK: Kogan Page Limited. ISBN 0749431857
7. Deise, M. V., C. Nowikow, P. King and A. Wright. 2000. Executive's Guide to E-Business: From Tactics To Strategy. John Wiley & Sons.
8. McCreary, L. 2008. What was privacy? *Harvard Business Review* (October): 123-131.
9. Chapman, Merrill R., In search of stupidity: over 20 years of high-tech marketing disasters (2nd Edition) , Apress, ISBN 1-59059-721-4
10. Janal, D. S. 1995. Online Marketing Handbook. New York: Van Nostrand Reinhold. ISBN: 0442020589
11. Arnold, V. 2006. Behavioral research opportunities: Understanding the impact of enterprise systems. International Journal of Accounting Information Systems 7(1): 7-17.
12. Interactive Advertising Bureau. 2005. Interactive Advertising Basics 2005: 28 Reasons to Use Interactive Advertising.
13. Reid, Robert H. (1997). Architects of the Web: 1,000 Days that Built the Future of Business. John Wiley & Sons. Chapter Seven: 'Hotwired - Publishing on the Web' (pp 300-308) ISBN 0471171875
14. Strauss, J. and F. Raymond. 1999. Marketing on the Internet: Principles of Online Marketing. New Jersey: Prentice Hall Inc.
15. Anthony, J. H., W. Choi and S. Grabski. 2006. Market reaction to e-commerce impairments evidenced by website outages. International Journal of Accounting Information Systems 7(2): 60-78.
16. Cronin, M. J. 2000. Unchained Value: The New Logic of Digital Business. Harvard Business School Press.
17. David, J. S. 2003. Discussion of Information transfer among internet firms: The case of hacker attacks. Journal of Information Systems : 83-86.

ISSN 1512-1232

18. Deak, E. J. 2004. Economics of E-Commerce and the Internet with Economic Applications Card. South-Western Educational Publishing.
19. Knapp, M. 2003. E-Commerce: Real Issues and Cases. South-Western Educational Publishing.
20. Memp, P. 2006. Avatar-based marketing. Harvard Business Review (June): 48-57.
21. Mensah, N. and L. Velocci. 2006. Market reaction to e-commerce impairments evidenced by website outages: Discussant comments. International Journal of Accounting Information Systems 7(2): 82-86.
22. Miller, D. 2001. Rod Hoover: Royal & Sun Alliance sheds light on e-business and the state of insurance. Strategic Finance (March): 44-47.
23. Monahan, S. J. 2002. Discussion of The value relevance of revenue for internet firms: Does reporting grossed-up or barter revenue make a difference? Studies on Accounting, Entrepreneurship and E-Commerce. Journal of Accounting Research: 479-484.
24. Mooney, J. L. and W. D. Pittman. 1996. A guide to electronic commerce. Management Accounting (September): 43-47.
25. Cucuzza, T. G. and J. Cherian. 2001. The internet and e-business: Trends and implications for the finance function. Journal of Cost Management (May/June): 5-14.
26. Daigle, R. J. 2004. Discussion of: SportsStuff.com: A case study of XML technologies, e-business processes, and accounting information systems. Journal of Information Systems: 75-77.
27. Dalton, D. 1999. Is e-business for you? Strategic Finance (March): 74-77.
28. Anthony, J. H., W. Choi and S. V. Grabski. 2006. Market reaction to e-commerce impairments evidenced by website outages authors' response. International Journal of Accounting Information Systems 7(2): 87-90.
29. Murthy, U. S. and S. M. Groomer. 2004. A continuous auditing web services (CAWS) model for XML-based accounting systems. International Journal of Accounting Information Systems (5): 139-163.
30. Murthy, U. S. and S. M. Groomer. 2004. Reply to the discussions of 'A continuous auditing web services (CAWS) model for XML-based accounting systems'. International Journal of Accounting Information Systems (5): 175-181.
31. Norris, G., J. R. Hurley, J. Dunleavy and J. Balls. 2000. E-Business and ERP: Transforming the Enterprise. John Wiley & Sons.
32. O'Donnell, E. 2006. Discussion of the influence of scope and timing of reliability assurance in B2B E-Commerce. International Journal of Accounting Information Systems 7(2): 130-133.

Article received: 2010-04-12