Review of Electronic Data Interchange in Business to Business
E-Commerce in a Competitive Global Market

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Abstract
This paper elaborates a general review of Electronic Data Interchange, including technological infrastructure, how EDI works in an organization, barriers and benefit of EDI, as business partners from different parts of the world are collaborating, will explain how EDI contributes in the maintaining of their strong relationship and gaining of competitive global market.

Keywords: E-commerce, Electronic Data Interchange, Business To Business.

1. Introduction

The world has become a global village - people, companies, resources, products move from one country to another without any difficulties, due to the globalization. Companies are competing on each other to become a market leader and to gain competitive advantages by approaching different strategies. Firms are facing a lot of challenges and the numbers of competitors’ increases day by day. E-commerce has grown rapidly because of the advance of internet technologies, which includes the internet, the World Wide Web, wireless transmissions on mobile telephones or a personal digital assistant (PDA). E-commerce involves all business activities an organization can take such as business trading with each other, online banking, processes that company use to support their buying, selling, hiring, planning in use of the internet.

Business trading with each other is the part of Business To Business so basically Business To Business E-commerce is the transactions conducted between businesses on the web, it might be companies or government. The technology which companies use to transfer information between businesses is Electronic Data Interchange. By definition Electronic Data Interchange is the electronic transmission of information and documents such as invoices, purchase orders or bill of lading between computer systems in different organizations based on a standard, structure, machine-retrievable format [1]. Hill and Ferguson [19] described Electronic Data Interchange in detail as a “movement of business data electronically between or within firms (including their agents or intermediaries) in a structured, computer-processable data format that permits data to be transferred without rekeying from a computer-supported business application in one location to a computer–supported business application in another location”. Furthermore, they stated, the definition includes the direct transmission of data between firms, transmission using an intermediary such as a Value-added communication network or bank, and the exchange of computer tapes, disks or other storage devices between locations. Value-added network also known as VAN is a service that provides a way of data transmission between businesses in the EDI industry.

In earlier years before 1960s firms used to exchange documents such as invoices, purchase orders and bills of lading, which contain information like item numbers, descriptions, prices and quantities, but there were spending a lot of time and money entering data into their computers, printing paper forms, and then reentering the data on the other side of transaction. With the help of EDI companies are able to reduce errors, avoiding printing and mailing cost and eliminate reentering of data. The technology has been adopted by many businesses worldwide as a vehicle to eliminate paper works association with business transactions, thereby eliminating errors caused by entering data manually [2].
The Industries engaged in EDI can be retailers, suppliers, manufacturers, grocery, food brokers, logistics, healthcare supply etc. According to chang-tseh and binshan [2] “the history of EDI began in the early 1970s when the transportation industry (i.e. ocean, trucking and rail) formed the Transportation Data Coordinating Committee”. Retail chain each step is interdependent to each other from production to sales, has to bond to one another inorder to achieve the turnaround and productivity improvements sought to get maximum benefit from EDI, an order must flow right through a vendor’s system, right to the distribution center, without being re-entered or manipulated manually [17].

This article flows with understanding of the term EDI, with the support of previous articles it explains first the Infrastructure of the system, how the system works in an organization, barriers that make companies not to adopt EDI lastly the benefit EDI brings in an organization.

2. Technological Infrastructure of EDI

The technical infrastructure for implementing EDI has to involve components such as

i. Hardware meaning computer, modem and telephone line, the data which is stored in the company travel through the modem to an external computer or network.

ii. Software for communications, mail boxing of EDI transactions, mapping and translation.

iii. VAN, ASYNC, BISYNC and internet communications which various partners might require.

iv. Data backups and redundant power for reliability.

There are four tasks that are required to create and deliver an EDI message these are mapping, extraction, translation and communication, three of them are performed by software utilities called Extraction software, translation software, and communication software [21].

3. HOW EDI WORKS IN A FIRM

The following is the description of how Electronic transmission works from a buyer to the supplier, through a simple example of an individual making an order to a follower trading partner.
The initial stage a buyer prepares an order in his or her purchasing system and has it approved then EDI order is translated into an EDI document format called an 850 purchase order. The EDI 850 purchase order is then securely transmitted to the supplier either via the internet or through a VAN (Value Added Network).

Supplier’s EDI system then processes the order, data security and control are preserved throughout the transmission process using passwords, user identification and encryption. Both the buyer’s and supplier’s EDI applications edit and check the documents for accuracy.

On the word of MI0039- unit -10-EDI [23] discussed how EDI actually works using an example of ABC on how vendor generates an electronic purchase order in five steps as follows:

a. **Preparation of electronic documents**: The first step in any arrangement of Electronic Data Interchange is the assembly and organization of data by ABC’s internal application systems. Instead of printing out purchase orders, ABC’s system forms an electronic file of purchase orders.

b. **Outbound translation**: An electronic file is then been translated into a standard format. The result is a data file that contains a series of structured transactions related to the purchase orders. ABC’s EDI translation software will produce a separate file for each manufacturer.

c. **Communication**: ABC’s computer spontaneously makes a connection with its Value Added Network, and transmits all the files that have been prepared. Each file is processed by the VAN and is routed to the appropriate electronic mailbox for each manufacturer. Several manufacturers do not subscribe to the ABC’s VAN, so files are automatically routed to the appropriate network service.

d. **Inbound translation**: The manufacturers reclaim the files from their electronic mailboxes at their convenience, and reverse the process that ABC went through, translating the file from the standard format into the specific format required by the manufacturer’s application software.

e. **Processing electronic documents**: Each manufacturer will process the purchase orders received in their internal application systems.

There are two ways of connecting to EDI: Direct connection EDI and Indirect connection EDI. Direct connection EDI requires each business to operate its own on site EDI translator computer. Then the EDI translator computers are connected directly to each other using modems and dial-up telephone lines or dedicated leased lines.

Indirect connection EDI is when VAN (Value-added network) services are used, Value-added network is a company that provides communications equipment, software, and skills needed to receive, store and forward electronic messages that contain EDI translator sets. To use the services of a VAN, a company must install EDI translator software that is compatible with the VAN.

According to Hill and Ferguson [19] reveal VAN solves problems that might occur in direct communication, VAN provides following services relating to EDI. Mail boxing permits one trading partner to send transaction sets to the other’s mailbox for storage. When the other trading partner is ready, it will retrieve the transaction sets. This solves the problem of finding a time when both partners can communicate.

Trading partners which cannot afford the expenses of leased line and dual-up connections required to support direct and VAN-aided EDI. Companies have another alternative to switch on Internet and been able to do business with large customers that demand EDI capabilities from suppliers. Lankford and Johnson [18] stated “since June 1996, Harbinger has shipped software that can sort through a corporation’s outgoing electronic data interchange files to determine the ones the user actually wants to send over the internet instead of through a value-added network”. The software, called Trusted Link Guardian, then wraps the internet-destined EDI file in an encrypted electronic mail envelope and dispatched it.

4. **Barriers Through Adoption of EDI**

The charges of implementing EDI differs extensively among companies, determine by skills of the business, technical personnel, and the condition of existing computer systems and most important the
firm’s ability to absorb and adapt to change. EDI has proven itself to be too complicated and expensive for many small and many midsize companies. As a result, EDI has not been widely adopted. As mention by Tuunainen [7] when examine small businesses in the automotive industry notice that small businesses are “lacking EDI awareness, confusing standards, too high costs, low transaction volume, technical complexity and data security concerns”. Mostly large companies with well-built information systems can easily use EDI technology and benefit from it compared to small and medium companies. In the adoption of EDI companies faces many problems in the using of the system, ever since it involves Information Technology firms were force to have an IT expert first before the implementing of the technology for it to run successful. The technology infrastructure is the major obstacle as well, companies needs to have strong hardware and software to support the system.


5. Benefits of Implementing EDI

Small, Medium and large organizations are in need of EDI, especially firms, which deal with suppliers. EDI saves a company money by providing an alternative to or replacing information flows that require a great deal of human interaction and materials such as paper documents, meetings, faxes. Even when paper documents are maintained in parallel with EDI exchange, e.g. printed shipping manifests, electronic exchange and the use of data from that exchange reduces the handling costs of sorting, distribution, organizing and searching paper documents. It allows a company to take advantage of the benefits of storing and manipulating data electronically without the cost of manual entry.

Key reasons for implementing EDI included “meet a customer requirement”, “improve customer service”, and “gain competitive advantage” [3]. According to Millen [3] reported the significant benefits of EDI to “make the firm more competitive and aid in achieving strategic goals”, “provide more timely information”, and “reduce information processing costs”. From the benefits of EDI, it shows how important for a firm to engage in EDI. The most common advantage of EDI includes Reduced labor costs of mailing and data entry, Timeliness of information, Higher quality information, Better communication improved business processes, Standardization, Removes uncertainty, Reduce inventories [2], [8], [22], [23]. Mackay and Rosier [7] illustrate that one of the principal objectives of using was to “achieve efficiency in communicating the needs of the manufacturers’ production lines to the suppliers of component parts”.

Logistic management uses EDI to simplify their activities, Calza and Passaro [20] stated “EDI allows the speeding-up of order management and bill/invoice issue through an interactive connection network between the supply chain members”, not only logistic management even automotive industry according to Mackay and Rosier [7] “the Australian automotive industry has attempted to improve its international competitiveness through the adoption of information technologies such as EDI”.

EDI support many sectors in an organization in different ways as the positive result of the software the companies’ activities such supply chain is been speeding up and in lower cost than before, companies save time, improve customers and suppliers relation encourages businesses efficient and effectiveness which outcome productivity lead to an increase of competitive global market.

6. Discussion

Current review of the Electronic Data Interchange has reveal that EDI as a standard communication protocol for system to system integration, companies in a variety of industries use EDI to transmit business information electronically, organizations that handle large volumes of data often use EDI to minimize data entry and share information with other systems within their organization.

This paper had discussed the benefits that companies gain from the use of EDI. It has shown a variety of outcomes from the technology compared to the traditional method, not all firms are in a good position of adopting the system, especially small and mid sizes enterprises so barriers of adoption was over looked as well. Then it explains the architecture and how the technology works in a firm.

The three alternative of using EDI were examined, which shows a firm can engaged in Direct connection EDI, Indirect connection EDI which is the use of VAN and Web EDI the use of the internet.
It’s proven that the use of Direct and Indirect connection EDI is expensive to some companies so the companies discover the Web EDI and XML.

The internet and extensible markup language (XML) have decrease the entry barriers to e-commerce, in both cost and complication. The arrival of XML should not be interpreted as the end of EDI. XML does not replace EDI, but enable it to bring e-commerce to small and midsize companies. In today’s competitive global market companies are working hard to be competencies, by generating new ideas, they tried to come up with a creative and innovating product to satisfy a wide range of customers worldwide with the help of EDI organizations will achieve their goals of meeting customers’ expectations.

7. Conclusion

By concluding Electronic Data Interchange is an essential technology in any kind of businesses. It effectively helps the organization to communicate to each other. As in anything with advantages must have weaknesses somehow although companies tried to come up with the different solution of using EDI from direct, VAN to the Internet there still some problems occur, which is security issues.

Security’s problem might be overcome within a short time cause company every day introduce novel ways of doing business same as Information Technology sector expands with innovation technology, previous problem in an earlier year is solved so EDI security will evenly be over whelmed.

8. References

[23] MI0039-unit -10- Electronic Data Interchange