

## **Applications of electronic data interchange technology in retail business: advantages and barriers to implementation**

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### **Keywords**

EDI technology, electronic documents, information systems, retail efficiency, transmission.

### **Abstract**

*India has already proven its mettle as a superpower in the arena of information technology. The retail industry offers to bloom to the same level of conducive environment and support is provided to it. 'Retail is detail' is the mantra and without effective use of IT, managing a successful retail enterprise could be quite impossible. Retailers and their vendors are now able to transfer data between themselves through the use of Electronic Data Interchange technology. This article divulges the significance and applications of EDI technology from management perspective that facilitates almost paperless transactions with high levels of efficiency in retail industry.*

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### **Introduction**

Electronic Data Interchange (EDI) is defined as the exchange of business information, through standard interfaces, by using computers. Since EDI is defined as the exchange of electronic documents between organizations, the EDI acronym has also been sometimes interpreted as Electronic Document Interchange. The National Institute of Standards and Technology in a 1996 publication defines Electronic Data Interchange as "the computer-to-computer interchange of strictly formatted messages that represent documents other than monetary instruments".

EDI refers to the structured transmission of data between organizations by electronic means. It entails computer-to-computer transmission of data and business documents from retailer to vendor and vice-versa.<sup>1</sup> It helps in establishing an efficient information flow on stock movement and the vendors get to know of sales and inventories instantaneously. Reorder supplies are immediately planned and executed by the vendors following acceptable norms. This process eliminates the time taken to exchange documents for placing orders, thus achieving just-in-time (JIT) inventory management. EDI is done through web-enabled servers or with the help of the organization's ERP (Enterprise Resource Planning) package that interacts with the vendors' systems. Even in this era of technologies such as XML web services, the Internet and the World Wide Web, EDI is still the data format used by the vast majority of electronic commerce transactions in the world.

To be more efficient with their information systems, many retailers now rely on the EDI and Universal Product Code (UPC). UPC scanning is often the basis for product-related EDI

data. Tens of thousands of firms around the world use some form of EDI system. Consider this scenario: Virtually every pair of blue jeans sold in a department store today is tracked through a barcode system. When the retailer's computer system sees that the supply of a particular style and size is low, it automatically generates a purchase order that is transmitted to the apparel manufacturer via EDI. The manufacturer's EDI system imports the information into a computer data base. It is confirmed that the product is in stock, the product is found via barcode, and a trucking company is notified. When the truck picks up the jeans, the EDI system creates an advance shipment notice and sends it via EDI to the retailer. At the same time, a barcode label for the shipping carton is created. When the truck delivers the jeans, the retailer scans the barcode label. The retailer then automatically generates an electronic funds transfer.<sup>2</sup>

Today more retailers are expanding their EDI efforts to incorporate Internet communications with suppliers. One such retailer is the Piggly Wiggly supermarket chain, which has reduced its EDI costs by 20 per cent since converting from a conventional to an Internet-based EDI system: "The Internet changed the picture for EDI. Suddenly, it seemed there was a single, low-cost, all-inclusive way to connect computer networks for data exchange. Why absorb high up front and transaction costs, when you could make use of standard PCs? New standards allow secure, direct connections between supplier and customer, over the Internet."<sup>3</sup>

### **QR and EDI Systems**

Many medium-sized and large retailers use computers to complete and process orders based on EDI and quick response [QR] inventory planning, and each purchase is fed into a computer data bank. Yet, with the advances in computerized ordering software, even small retailers may have the capability of placing orders electronically – especially if they buy from large wholesalers that use EDI and QR systems.<sup>4</sup>

EDI lets retailers do QR inventory planning efficiently – via a paperless, computer-to-computer relationship between retailers and vendors. Research suggests that retail prices could be reduced by an average of 10 per cent with the industry wide usage of QR and EDI. One of the advantages of QR and EDI is that retailers hold "leaner" inventories since they receive new merchandise more often. This illustration shows the value of QR and EDI: Implementing a Web-based, EDI system to communicate with most of its suppliers is saving United Supermarkets of Lubbock, Texas, up to \$400,000 a year in transaction costs. "It's very easy to move into this [EDI] world today," said the chief information officer at the 44-store chain. By making the transition to EDI with suppliers, the retailer can now process purchase orders, receipts, and invoices much more efficiently. United is also able to have real-time communication and tracking capabilities. Moreover, the retailer has reduced per-transaction costs by \$5 to \$6. The implementation was done in two phases. United's 20 major suppliers – who provide about two-thirds of its goods – were put online first. This took about six months. Getting the second-tier suppliers to become EDI-compliant in accordance with United's system took a bit longer.<sup>5</sup>

### **Standards**

The EDI standards were designed to be independent of communication and software technologies. These include modem (asynchronous, and bisynchronous), FTP, E-mail, HTTP,

AS1, AS2, etc. In 2002, the IETF published RFC 3335, offering a standardized, secure method of transferring EDI data via e-mail. On July 12, 2005, an IETF working group ratified RFC4130 for MIME-based HTTP EDIINT (aka. AS2) transfers, and is preparing a similar RFC for FTP transfers (aka. AS3). While some EDI transmission has moved to these newer protocols, the providers of the value-added networks remain active.

There are four major sets EDI standards:

- The UN-recommended UN/EDIFACT is the only international standard and is predominant outside of North America.
- The US standard ANSI ASC X12 (X12) is predominant in North America.
- The TRADACOMS standard developed by the ANA (Article Numbering Association) is predominant in the UK retail industry.
- The ODETTE standard used within the European automotive industry.<sup>6</sup>

In the retail industry, two data transmission standards are used: (1) the Uniform Communication Standard (UCS), used primarily by the grocery sector, and (2) the Voluntary Inter-industry Commerce Standard (VICS), used by the general merchandise retailing sector. Using these standards, retailers and vendors can exchange information about purchase order changes, order status, transportation routings, advance shipping notices, on-hand inventory status, and vendor promotions, as well as information that enable vendors to put price tags on merchandise. The development and use of these standards is critical to the use of EDI because they enable all retailers to use the same format when transmitting data to their vendors.<sup>7</sup>

### **Transmission Systems**

In large retail firms, communications among employees within a company, such as the communications between store managers, planners, and distribution center employees, are done through an intranet. An intranet is a local area network (LAN) that employs Internet technology in an organization to facilitate communication and access to information internally.

To communicate with people outside the organization, such as vendors and transportation companies, large retailers like Wal-Mart initially developed their own proprietary transmission systems. But now EDI transmissions between retailers and vendors occur over the Internet through extranets. An extranet is a collaborative network that uses Internet technology to link businesses with their suppliers, customers, or other businesses. The shift from a proprietary transmission network to Internet-based networks enables retailers and vendors to take advantage of EDI economically. For example, Target Corporation has shifted its proprietary EDI network to an extranet system called Partners Online, and Wal-Mart's extranet is called Retail Link.<sup>8</sup>

Large retailers have established two separate international public trading exchanges, Global Net Xchange and World Wide Retail Exchange. Global Net Xchange includes Carrefour (France), Sears (US), Kroger (US), Sainsbury's (UK), and Metro AG (Germany). World Wide Retail Exchange has Albertsons (US), Boots Group (UK), Tesco (UK), Coop Italia (Italy), Dairy Farm (Singapore/Australia). Normal EDI transactions can be very costly to manage and many

companies have said that EDI is not cost-effective for data exchange with all but the top 100 to 200 suppliers.

### **Security**

Security has become a bigger challenge in recent years as a result of EDI using extranets and the operation of Internet retail channels. Because the Internet is a publicly accessible network, its use to communicate internally and externally with vendors and customers raises security issues. Some potential implications of security failures are the loss of business data essential to conducting business, disputes with vendors and customers, loss of public confidence and its effect on brand image, bad publicity, and the loss of revenue from customers using an electronic channel.<sup>9</sup>

### **Advantages of EDI**

- The speed in transmission of information is greatly reduces cycle time, or the time between the decision to place an order and the receipt of merchandise.
- EDI technology reduces costs involved in paper handling, filing, storage and mailing by manipulating data electronically without the cost of manual entry. It also reduces the cost of order processing. According to the 2008 Aberdeen report "A Comparison of Supplier Enablement around the World", only 34 per cent of purchase orders are transmitted electronically in North America. In EMEA (Europe, the Middle East, and Africa) 36 per cent of orders are transmitted electronically and in APAC (Asia-Pacific) 41 per cent of orders are transmitted electronically. They also report that the average paper requisition to order costs a company \$37.45 in North America, \$42.90 in EMEA and \$23.90 in APAC. With an EDI requisition to order costs are reduced to \$23.83 in North America, \$34.05 in EMEA and \$14.78 in APAC.
- Large scale retailers have long believed in the power of electronic communication with their supply chain partners. By adopting B2B1/EDI, retailers and wholesalers are able to harness substantial tactical and strategic benefits over a short period of time.<sup>10</sup>
- EDI and other similar technologies save company money by providing alternative information flows that require a great deal of human interaction and materials such as paper documents, meetings, faxes, etc.
- It improves the overall quality of communications through better record keeping; fewer errors in inputting orders, order receipt, and ASNs; and less human error in the interpretation of data.
- It serves as a rapid delivery mechanism. Automatic stock replenishment systems use daily or weekly Electronic Point of Sales (EPOS) data to generate a fresh order for rapid delivery overnight or within the next 48 hours. Sales data is sent electronically to the depot or to the manufacturer by EDI. The order from the store can be automatically converted into a picking list, a dispatch note and an invoice without the need to key in the data. Figures from Internet Gateway Device (IGD) 1997 indicate that up to 98 per cent of the UK grocery multiples have committed themselves to EPOS and EDI implementation.<sup>11</sup>
- It serves as a tool for strengthening the relationship between the retailer and the supplier.

## Barriers to Implementation

- Many a business perceive that EDI is a data format and a system for exchanging business documents with external entities, and integrating the data from those documents into the company's internal systems. Successful implementations of EDI take into account the effect externally generated information will have on their internal systems and validate the business information received. For example, allowing a supplier to update a retailer's Accounts Payables system without appropriate checks and balances would be a recipe for disaster. Businesses new to the implementation of EDI should take pains to avoid such pitfalls.
- Increased efficiency and cost savings drive the adoption of EDI for most trading partners. But even if a company would not choose to use EDI on their own, pressures from larger trading partners (called hubs) often compel smaller trading partners to use EDI.<sup>12</sup> For example, in late 2003, Greg Kieler, co-president of Worktools International, an \$8 million specialty paintbrush company, got a letter from Lowe's requesting that his firm adopt a new EDI system that would let Lowe's track inventory more easily. Worktools' deadline: April 2005. This notification presented a challenge because Worktools doesn't have an IT department, and none of its 40 employees has real computer expertise. But Kieler didn't have a choice; Lowe's is his largest customer. Kieler hired consultants that had worked with Lowe's. They upgraded Worktools' software, charging a \$1,000 set-up fee and \$125 a month in ongoing support. Worktools also paid \$600 a year to have its products listed in UCCnet, a registry run by the Uniform Code Council. When Lowe's went live with the system, Kieler was ready. "Now we hopefully have an inside track on making Lowe's happy," he says.<sup>13</sup>
- Accompanying business process change is a significant barrier. Existing business processes built around slow paper handling may not be suited for EDI and would require changes to accommodate automated processing of business documents.
- EDI is cost effective. The preliminary expenses and time that arise from the implementation, customization and training can be costly and therefore may discourage some businesses. The key is to determine what method of integration is right for the company which will determine the cost of implementation.

## Conclusion

Today's information-centric retail management philosophy places heavier and heavier demands on retail managers to allow the information systems at the store level to grow and encompass a broader spectrum of data. A centralized inventory management, transmission of documents between the trading partners, accounting and MIS facilitate better performance in retail sector. The Internet gave EDI quite a boost. Applications of EDI and similar technologies have made a deep impact on the corporate retail business by overcoming implementation barriers in this era of technologies.

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