Electronic Data Interchange

E

David Whiteley
Manchester Metropolitan University, UK

INTRODUCTION

The popular notion of e-commerce is a consumer interacting with a Web page to buy a book from Amazon or a ticket from Expedia. This is an important aspect of e-commerce, but the applications and technologies used in e-commerce are much wider than business-to-consumer e-commerce facilitated by the Internet and the World Wide Web.

E-commerce is summarized by the phrase "doing business electronically," and to that we should add the qualification that the business is conducted between the organization and some external party. E-commerce is defined by Wigland (1997, p. 5) as "…the seamless application of information and communications technology from its point of origin to its endpoint along the entire value chain of business processes conducted electronically and designed to enable the accomplishment of business goals."

This includes business-to-business transactions as well as business-to-consumer transactions, and does not presume the type of technology that is used to facilitate these transactions. There are authors that seek to define e-commerce in a way that limits the term to business transacted over the Internet, but this seems to be without merit: Did not transactions conducted using Minitel or Prodigy serve the same purpose as today's Web-based transactions, and does not the development of m-commerce still come within the more general classifications of e-commerce and e-business?

Whiteley (2000) suggests that e-commerce was facilitated by three technologies: electronic data interchange (EDI), electronic markets, and the Internet- (or e-shop) type facilities. EDI and electronic markets predate the e-shop model and, for the *Encyclopedia of E-Commerce, E-Government, and Mobile Commerce*, this article will concentrate on EDI.

What is EDI?

EDI is an e-technology that supports business-to-business transactions and is principally used by large organizations that have a large volume of standardized transactions. There are a number of definitions around, but (unlike definitions of e-commerce and e-business) they are all different ways of saying the same thing. The definition adopted by the UK National Computing Centre (Parfett, 1992, p. 7) is the "transfer of structured data, by agreed message standards, from one computer system to another, by electronic means."

The first phrase of the definition, "structured data," brings most trade exchanges within the potential scope of EDI. A simple business-to-business trade exchange consists of an order, delivery note, invoice, and payment, and these are all structured data. The utility and preciseness of the trade exchange data is enhanced by the use of codes in place of addresses and product descriptions. The Article Numbering Associations (ANA) is one set of organizations that have devised appropriate coding systems; EAN (European Article Number) and UPC (Universal Product Code) are examples of this. The scope of EDI has also been extended from basic trade documents to requirements such as customs clearance, container information, and continuous replenishment (Lauden & Traver, 2004). EDI is also used for other applications, for example, in banking (electronic funds transfer, EFT), education, medicine, and weather forecasting.

The phrase "agreed message standards" implies a message coding system that has wider application than just the two (or a small group of) organizations involved in trade exchanges. EDI standards were initially devised by industry-sector organizations and often on a national basis. Examples of early EDI standards include Tradacoms, devised by the UK ANA for general merchandise, Odette, used by automobile assemblers, and UCS, used in the grocery trade in the United States. A difficulty with the early message standards was that they were trade-sector or nationally based. As the use of electronic trade exchanges expanded to a wider range of products and across international borders, suppliers were increasingly being asked to implement more than one standard. The answer to this problem was to devise a standard that was more widely accepted and catered for a greater range of requirements. This resulted in the ANSI X12 standard in the United States, and EDIFACT (EDI for Administration, Commerce and Transport) in Europe. EDIFACT was developed under the auspices of the United Nations (UN) Economic Commission for Europe but was subsequently adopted as the international standard at a meeting of the International Organization for Standards in September 1987. Since that date, the EDIFACT standard has continued to develop and now includes in excess of 190 mes-

sages (trade documents). The full standard is available on the UN Web site (2004). The standard is vast, but that does not mean that an individual transaction has to be complex.

It is the phrase "from one computer system to another" that distinguishes the application of EDI from most other e-technologies. The concept is of an exchange that directly links the computer application of the customer to that of the supplier. This can be, for example, the stock-control or replenishment system of a supermarket chain "talking" to the order-processing system of the supplier of breakfast cereals, or the material and requirements planning system of an automobile assembler issuing just-in-time orders for the delivery of components and subassemblies by the supplier of those products. EDI is used for business-to-business transactions that are computer generated, frequently repeated, and computer processed. To gain the full benefit of EDI, there should be no requirement for manual (administrative) intervention at either end. EDI is the e-technology that most effectively automates and integrates the logistics supply chain. It facilitates the creation of an interorganization information system (IOS) integrating the business systems of customers and suppliers, and it can include other players such as shippers, customs authorities, and banks.

Finally, "by electronic means" implies the transaction takes place over a network. Traditionally, the network has been a commercial value-added data service (VADS), also known as a value-added network (VAN). These networks, marketed and managed by companies such as AT&T and GE, provide high-quality network services. A feature common to all these networks is the provision of post-and-forward facility so senders can transmit their EDI exchanges at times that suit them, and the addressees can pick them up in accordance with their own operating schedules. The VADS operator can also provide other services such as consultancy and trusted third-party services. In recent years, the Internet has been used as an alternative EDI network. The use of the Internet can be substantially cheaper than a VADS (savings of up to 90%

are reported; Chaffey, 2002), but there are, or have been, concerns about reliability and security. AS2 is a recently introduced transport standard for transmitting EDI over the Internet (Adshead & Thomas, 2003)

The EDIFACT Standard

To understand EDI, it is useful to have an idea of what an EDI message would look like. As already stated, the EDIFACT standard is vast, but any specific requirement will only utilize a small subset of that standard (although agreeing on the exact subset that is to be used can be a problem). To illustrate the standard, let us consider the order shown in Figure 1.

The customer and the supplier will have already agreed on the terms of the trade. The address and product codes are standard for the trade sector, and thus names, addresses, and product descriptions are not needed in the electronic transaction. This order can then be coded into EDIFACT giving the short message shown in Figure 2. Note that the codes not in Figure 1 are qualifiers specified by EDIFACT; for instance, the DTM (date-time) data segment includes a *4*, which specifies it is the order date, and *102*, specifying the date is in century date format.

The customer and supplier will have EDI software integrated in their stock-control and order-processing application, and thus the EDIFACT message can be automatically coded and sent from the customer and will be automatically received and decoded at the supplier's end.

EDI Trading

Once the e-technology for EDI trading is installed, then the organizations involved can trade very efficiently. The impetus for EDI trading normally comes from a large customer organization that is sending out many orders on a daily or weekly basis to a large number of suppliers. A supermarket chain typically has in excess of 1,000 suppliers (and many of them will be common to several or all the major supermarket chains). The major motor manufactur-

Figure 1. Example order

```
Customer:      Johnson Wholesale
               address code: 6261601
Supplier:      Mary's Preserves
               address code: 3231301
Order No.:     929190
Order Date:    30 Sept 2004 (20040930)
Product 1:     Organic English Mustard
               quantity: 200 (300 gm) pots
               product code: 3231604
Product 2:     Yorkshire Piccalilli
               quantity: 180 (500 gm) pots
               product code: 3231627
```

Related Content

Antecedent Effects of Info Content on User Attitudes Toward Radical Technology-Brand-Extension: Info Content on User Attitudes of Brand Extensions
Pratim Dattaand Geoffrey Hill (2020). *Journal of Electronic Commerce in Organizations (pp. 36-58).*
www.irma-international.org/article/antecedent-effects-of-info-content-on-user-attitudes-toward-radical-technology-brand-extension/241247

Leveraging Customer Data Integration for Effective E-CRM Analytics
Thomas P. Van Dyke, Hamid R. Nematiand Christopher D. Barko (2006). *Encyclopedia of E-Commerce, E-Government, and Mobile Commerce (pp. 703-708).*
www.irma-international.org/chapter/leveraging-customer-data-integration-effective/12617

Factors Associated With the Adoption of Health Apps: Evidence From Emerging Economies
Debarun Chakraborty, Aaliyah Siddiquiand Mujahid Siddiqui (2021). *Journal of Electronic Commerce in Organizations (pp. 20-39).*
www.irma-international.org/article/factors-associated-with-the-adoption-of-health-apps/288311

Effective Web Site Design: Insight from Information Processing
Deborah E. Rosen, Elizabeth F. Purintonand Scott J. Lloyd (2005). *Advanced Topics in Electronic Commerce, Volume 1 (pp. 99-120).*
www.irma-international.org/chapter/effective-web-site-design/4408

Evaluating the Relevance of Information Systems Strategic Planning Practices in E-Business Contexts
Ganesan Kannabiranand Srinivasan Sundar (2013). *E-Commerce for Organizational Development and Competitive Advantage (pp. 18-39).*
www.irma-international.org/chapter/evaluating-relevance-information-systems-strategic/74516