

## New EDI Developments in the Era of Electronic Commerce

S. J. Ok\*

전자상거래시대에 있어 전자문서교환(EDI)의 새로운 발전방향에 관한 소고

옥 석 재

**Key Words** : EDI(전자문서교환), Trade Facilitation(무역절차간소화), VAN(부가가치통신망), Web-based EDI(웹표준 전자문서교환), XML/EDI(확장마크업언어 전자문서교환), Simpl-EDI (簡素 전자문서교환), Form-based EDI(폼 전자문서교환), Lite-EDI (라이트 전자문서교환)

### Abstract

운송에 필요한 각종 서류와 정보의 효율적 교환은 국제물류시스템의 중요한 일부분이 되었다. 또한 EDI(전자문서교환)는 수출입에 필요한 각종 상거래 서식을 컴퓨터가 읽을 수 있는 표준화된 전자문서의 형태로 바꾸어 교환함으로써 무역절차의 간소화와 운송서류의 신속한 교환을 가능하게 하여 물류 효율성을 증대시키는 것으로 알려져 있다. 이러한 맥락에서 세계 각국의 항만당국은 자국의 물류혁신을 도모하기 위하여 경쟁적으로 EDI의 도입을 추진해왔다.

그러나 90년대에 들어 EDI의 발전은 처음의 기대와는 달리 저조한 것으로 나타났다. 이는 크게 두 가지로 설명된다. 첫째는 EDI 문서의 국제표준을 제정하는 UN/ECE 산하 WP4의 표준제정 및 공표의 비효율성으로 인해 실제 상거래에서 필요한 문서들의 EDI 표준화가 제때에 이루어지지 않았다는 점이다. 두 번째 이유는 대부분의 EDI 사용자가 전자문서의 교환 통로로 이용해 왔던 부가가치통신망(VAN) 서비스의 고비용적인 구조로 인하여 비용에 민감한 중소기업과 화주들의 폭넓은 이용을 저해해왔다는 점이다.

따라서 본고에서는 EDI의 확산을 저해했던 두 가지 문제점에 입각하여, 먼저 효율적 EDI 표준 제공을 위한 국제적 노력의 산물인 CEFAC (Center for Facilitation of Procedures and Practices for Administration, Commerce and Transport)와 보다 안전하고 신뢰성 있는

\* 정희원, 부산대학교 국제통상정보컨설팅센터 전임연구원

전자상거래 솔루션의 마련을 위해 이루어진 각종 국제기구들의 활동 및 결과물들을 소개하고, 다음으로 인터넷의 급속한 확산으로 새롭게 개발되고 있는 Web-based EDI, XML/EDI, Simpl-EDI, Form-based EDI 그리고 Lite-EDI의 저비용적 구조 측면을 분석하여 중소기업 화주들의 EDI에 대한 인식을 제고시킴으로써 EDI의 전반적인 확산을 도모하고 있다.

## 1. Introduction

The movement of commercial and other related information has become a critical part of the international trading system. Businesses throughout the world are transmitting and exchanging commercial information electronically and, as a result, revolutionizing the way of doing business. Fuelling this revolution is the substantial efficiencies to be gained from the transition from a paper-based manual system to Electronic Data Interchange (EDI) in the global economy.

This aspect is all the more sensitive in the field of international transport because it is one of the nerve centers for the operation of the enterprise. In that context, port authorities have seen clearly that the development of EDI is an essential element in their competitiveness. Consequently, most large ports across the world have developed individual EDI systems.

There were high expectations for EDI development in shipping and port community but the growth was slow. It has been hampered by the lack of EDI standard format and the high cost of using VAN (Value Added Network) services. International standards tended to take a long time to be developed to a level where they match business requirements and EDI could not widely embrace small to medium sized shippers owing to high cost of using VANs services (Ok, 1998).

However, the rapid evolution of digital communications technologies and the Internet is changing the basis for the emerging global electronic trading system.

This paper examines basic concepts and issues concerning to EDI standard development. It then discusses the nature of new EDI developments by considering its scope and impact on global business environment.

## 2. EDI Standards Development

The genesis of EDI has been traced back to the 1948 Berlin Airlift, where the task of co-ordinating air-freighted consignments of food and consumables which arrived with differing manifests, languages and numbers of copies, was addressed by devising a standard manifest to be filled in by aircraft before unloading. It was not until the 1960s, however, that the rail and road transport industries began to think about standardizing documents and replacing paper-based methods of communication.

A crucial component of EDI is the exchange of commercial documents on the basis of standardized formats between computers of different organizations using electronic transmissions. When commercial trading partners exchange data electronically, it is encoded and decoded by the computer software of both parties. Consequently, the information must be

unambiguous in order to avoid different interpretations.

In the early efforts in EDI, however, a variety of standards have been developed, partly industry-oriented and partly restricted to national areas, also known as proprietary standards. The abundance of proprietary standards caused a lot of troubles in the transmission of documents between industries or countries.

In the late 1970s and early 1980s, interest in universal or cross-industry standards started to rise as companies began to expand EDI beyond those industry-specific applications that were first developed. In 1978, the American National Standards Institute (ANSI) was set up to establish national standards in all areas of trade and commerce in U.S. ANSI Chartered Accredited Standards Committee (ASC) to perform the actual standard development. A more significant move toward standardization came with the ANSI ASC X12 standards. At about the same time, the UK Department of Customs and Excise, with the assistance of the British Simplification of Trade Procedures Board (SITPRO), was developing its own standards, called TRADACOMS, for documents used in international trade. This was later extended by the United Nations Economic Commission for Europe (UN/ECE) into what became known as the GTDI (General-purpose Trade Data Interchange) (Schatz, 1988). Because of the existence of totally incompatible standards between Europe and the United States, there were many problems in the transatlantic and inter-industrial use of EDI.

Since 1985 two organizations were engaged in providing international common standards: the UN/ECE Working Party 4 in Europe and the Joint Electronic Data Interchange (JEDI) Co-ordination

Committee in the U.S. The JEDI committee has seven members: the ANSI Committee for Business Data Interchange (ANSI- X12), the Automotive Industry Action Group (AIAG), the National Bureau of Standards, the automotive industry, the shipping industry, the rail industry and the Uniform Communication Standards Committee (Cuyvers and Janssens, 1992).

Meetings have been held with the UN/ECE Working Party 4 and JEDI, aimed at (1) identifying the differences between both syntax rules, and (2) making a comparison of data elements and message/transaction standards (Trafford, 1986). The resulting work is now known as UN/EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport). Formally adopted by many countries, both developed and developing, UN/EDIFACT provides a universal language, spoken among computers, through which international trade participants can communicate. It comprises a set of standards, directories and guidelines for the electronic interchange of structured data. Recommended within the framework of the United Nations, the rules are approved and published by the UN/ECE in the United Nations Trade Data Interchange Directory (UNTDID) and are maintained under agreed procedures. UN/EDIFACT was formally accepted as an international standard by ISO (International Organization for Standardization) in September 1987 and the number subsequently ascribed to it was ISO 9735 (Boss and Ritter, 1993).

### 3. Trade Facilitation and CEFACT

With the great increase in the volume of

international trade over the years, documentary and procedural complexities were major obstacles to the unfettered flow of goods. A series of international co-operative efforts have been made to simplify those inefficient trade procedures and formalities. Particularly, a group of participants in the United Nations Economic Commission for Europe (UN/ECE) has been devoted to reducing certain inefficiencies inherent in conducting international trade.

In 1971, the UN/ECE established the Working Party 4 on the Facilitation of International Trade Procedures (WP4). The WP4 reached a consensus on priorities and policies in trade facilitation work with international co-operation. As a result of the work, many improvements have been introduced in the trade-related information flows by simplifying the requirements, harmonizing the procedures and the documentation, standardizing commercial practices and introducing agreed codes for the representation of information elements (UN/ECE, 1993).

With the rapid development of electronic commerce technologies in the 1980s, WP4 focused its work to provide the globally standardized trade documents exchange system by EDI. The result is UN/EDIFACT that provides the basis for a truly international EDI standards.

In the 1990s, the expansion of the Internet drove WP4 to be reorganized in a time of rapid technological changes in electronic commerce. The UN/ECE replaced the WP4 with a Centre for Facilitation of Procedures and Practices for Administration, Commerce and Transport (CEFACT) in order to improve worldwide co-ordination of trade facilitation and enhance the ability to include all aspects of EDI

developments, particularly for the SME (Small to Medium Sized Enterprise) community. CEFACT reengineered its organization and procedure to add greater efficiency in the endorsement of its decisions and recommendations. For this, CEFACT empowered its working groups to undertake specialized activities on behalf of the Centre and hence working groups were no longer to report their decisions to upper decision-making organizations. This change should lead to a great improvement in standards implementation process by enabling effective endorsement of CEFACT recommendations to governments and the private sector.

The first session of CEFACT was held in Geneva from March 17 to 18, 1997 (UN/ECE, 1998a). CEFACT's unique position comes from the worldwide, active participation in its work by governments, business and trade representatives from UN/ECE, as well as other international organizations such as the WTO, UNCTAD, OECD, ICC, and other international organizations.

As the successor to WP4, CEFACT organised the new UN/EDIFACT Working Group (EWG) and empowered it to develop and maintain UN/EDIFACT. The EWG has two strategic objectives: (1) continuation of the development and maintenance of UN/EDIFACT, (2) full development of the object-oriented approach to the design of future messages. With both strategic objectives, EWG takes into account the special requirements of SMEs for simple and stable messages that can be incorporated into effective and inexpensive applications (e.g., Simpl-EDI, Forms and Web-based EDI). (UN/ECE, 1997a)

CEFACT shows enthusiastic interest in the possibility that Internet-based EDI will

eventually contain a relevant set of UN/EDIFACT for special benefits to SMEs. Consequently, CEFACT organised the Ad Hoc Working Group on Simpl-EDI and Forms and Web-Based EDI (SIMAC), and the Electronic Commerce Ad hoc Working Group (ECAWG) in order to analyse the applicability of the CEFACT work-programme to the emerging electronic commerce environment and to identify the areas in which CEFACT was contributing to electronic commerce now and could contribute in the future (UN/ECE, 1997b)

#### 4. New developments of EDI

##### 4.1 Web-based EDI

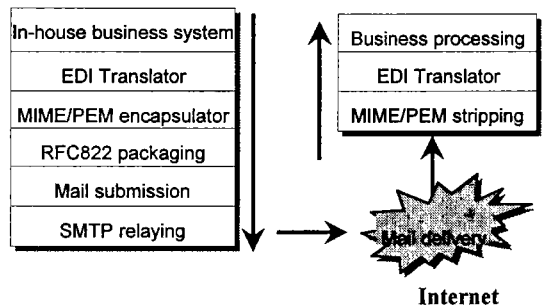
The Internet is rapidly emerging as an important medium for EDI, primarily because of the Internet's broad reach and much lower cost. As a result of the dissemination of Internet-based electronic commerce technologies, more and more trading partners can be reached over the Internet. Recently, EDI applications based on several Internet technologies are in use or currently under evaluation in order to provide cheaper and more efficient EDI trading systems, especially for small to medium sized shippers.

The Internet evolved from ARPANET, a distributed scientific network created by the U.S. Defence Department Advanced Research Projects Agency in 1969, based on a then-new communications technology called packet-switching. Initially, ARPANET included only four research laboratories, but it was quickly extended to dozens of universities and corporations, with new applications added, e.g., e-mail, remote

database access, and electronic bulletin boards. At the same time, a set of protocols called Transmission Control Protocol/Internet Protocol (TCP/IP) was developed. TCP/IP soon became prevalent in the academic community, and by the late 1980s, millions of computers and thousands of networks were using TCP/IP to connect to the Internet.

In the early 1990s with the rapid development of the World Wide Web (WWW), which has interactive and global hypermedia capabilities, the Internet has rapidly been moving from being a free, academic and scientific resource into a viable commercial environment. Consequently, the Internet has emerged as an important medium for EDI.

Figure 1 describes the basic process of EDI over the Internet. When information is ready to transmit, data from in-house application systems is translated into appropriate EDI standards format, such as EDIFACT. The EDI standardized data must be encapsulated using MIME (Multipurpose Internet Mail Extensions), which allows for identifying distinct EDI data types so that a recipient (or mail program) may determine what to do with them. To provide integrity, data



Source : Crocker, D., Network Working Group, IETF, Request for Comments: 1767, March, 1995

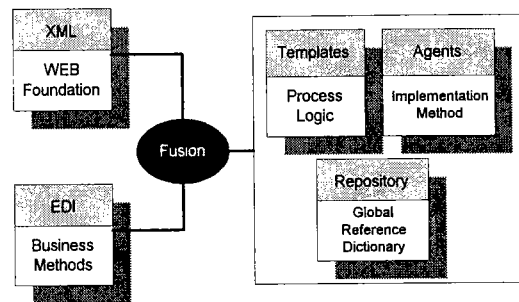
Fig. 1 A model of Web-based EDI system

origin authenticity, and, optionally, confidentiality, the data must also be encrypted using PEM (Privacy-Enhanced Electronic Mail), a set of procedures for transforming RFC 822 envelope messages to be routed over the Internet using SMTP (Simple Mail Transport Protocol). When using SMTP to exchange mail over the Internet, it is done on a peer-to-peer basis, which reduces the risk of losing or duplicating mail.

This is different from the classical EDI practice that involves a third party (VAN) who acts as the post office. If both trading partners are on-line to the Internet, SMTP will deliver the mail directly to the recipient's system. Because the delivery is made directly to the recipient's machine, the sender will know any difficulties associated with the delivery at the time it is happening. This results in greater confidence that the message is actually delivered. On the receiving end, the reverse process applies. The data content is taken out of the envelope, and is then decrypted. The actual EDI content is extracted from the message body using MIME directives. This data is passed to the translator, which reformats it so that the recipient's in-house application system can read it.

#### 4.2 XML/EDI

Classical EDI has a difficulty in sharing resources with other programs. However, XML/EDI makes it possible to share resources between trading partners. XML is the Extensible Markup Language subset of ISO's Standard Generalized Markup Language (SGML) developed by the World Wide Web Consortium (W3C) (Bryan, 1998). XML is providing Internet developers with new tools for implementing



Source: Peat, B. and Webber, D., "Introducing XML/EDI," <http://www.geocities.com>, 1997.

Fig. 2 The components of XML/EDI

electronic commerce and EDI solutions.

XML/EDI is the combination of five technologies, each part leveraging the others (Figure 2). They are XML, EDI, Templates, Agents and Repository. The last three components transform classical EDI into XML/EDI allowing a full dynamic process between trading partners. Templates are a set of processing rules of XML/EDI and contain the structure of EDI message formats. Agents provide the implementation methods that enable users to maintain or create new templates for new specific jobs. Repository is the shared Internet dictionary (Peat and Webber, 1997). XML can be integrated with existing EDI systems by allowing data generated or received in EDI format to be interpreted according to sets of predefined rules for display on standardized browsers using a user-defined template, rather than having to rely on specially customized display packages (Webber, 1998).

There are a number of expected advantages of XML/EDI, particularly for SMEs. For example, XML/EDI will make the implementation process easier and massively reduce the start-up costs because it uses existing EDI business methods

and message structures. XML/EDI Group was formed in July 1997, to specifically foster and advance the broad use of XML/EDI for next generation electronic commerce environment of special benefit to SMEs. The XML/EDI Group is already facilitating pilot efforts making initial use of XML for EDI in Intranet environments (Webber, 1998).

#### 4.3 Simpl-EDI

EDI has changed the work patterns of individuals and organizations providing them with new opportunities to improve their effectiveness and competitiveness and to better serve their customers. However, the costs and complexity of implementing EDI is substantial. In this context, major concerns are growing among many companies that their trade transactions could and should be simplified and standardized. A group of experts in CEFACT started working for more focused EDI messages based on simple, standard international data elements and well structured master files. The simplification in EDI transaction messages is achieved by removing complexity from the business process (UN/ECE, 1998). For large companies, most files can be exchanged prior to exchanging EDI transactions so that data can be synchronized for both partners prior to trading. For smaller companies, the master data can be held on a shared file at a defined location on a network. Master data can be exchanged by EDI, or via a shared file or catalogue on the Internet or by e-mail, fax, etc. Simpl-EDI is expected to reduce the complexity and cost of EDI and this will lead SMEs to more involvement in the electronic commerce environment (Johnston, 1997).

#### 4.4 Form-based EDI

Another significant EDI development is Form-based EDI via a third-party Internet site. The electronic forms are created either by translating classical EDI documents from EDI enabled trading partners, or by filling blank document templates in a third-party web site. Thus, even non-EDI enabled trading partners can view and fill out, using a standard web browser, electronic forms created by a program resident at the third-party web site. The non-EDI enabled trading partner only requires an Internet connection and a standard web browser. When they submit the business document using the browser, the third-party web site translates the electronic form data to an EDI formatted document and sends it to an EDI enabled trading partner or other VANs via the Internet or private networks. For return EDI documents, the third-party web site program translates them to the web pages and puts them into the secure section of the web site for the non-EDI enabled trading partner to retrieve using their web browser (Mark and Johnston, 1997). The most significant advantage of Form-based EDI is a great opportunity for even non-EDI enabled trading partners to reach their EDI enabled trading partners without implementing classical EDI. It also substantially lowers implementation and communication cost.

#### 4.5 Lite-EDI

Lite-EDI is another solution for providing SMEs with an integrated, cost-effective and easy-to-use system without progressing directly to the full implementation of applications to EDI technology. The key elements of Lite-EDI are

usage and technology simplification, technological transparency, and low usage and investment costs.

#### 4.6 Implications of newly developed EDI to VANs

In the classical EDI system, trading partners typically connect to VANs to exchange EDI documents on a store and forward basis. By acting as a post office among the trading partners, VANs provide mailbox services as well as other services such as translating flat files from the subscriber's application into EDI formatted documents, interfacing with other VANs, and supporting various telecommunications modes and data transfer protocols (Kalakota and Whinston, 1996)

Although classical EDI provides reliable and secure communication links, VANs providers increasingly feel the pressure from the current rapid expansion of the Internet. As communication costs are the biggest part of variable EDI transaction costs, it becomes a significant barrier at the level of SMEs. Therefore, companies, especially SMEs, have started to seek alternatives to VANs for the transmission of EDI messages.

The Internet provides a new inexpensive, global medium and makes use of software tools and also provides a great opportunity for non-EDI enabled trading partners to reach their EDI-enabled trading partners without implementing classical EDI. For example, instead of using an expensive VAN mailbox, the EDI message can be put into a MIME envelope and attached to an e-mail message that is delivered to the e-mail box of the recipient. Another significant benefit of an Internet-based solution is it provides easier integration of data with

in-house applications. For example, the Web technology from static HTML pages can be interactively integrated with internal databases. This opens up the scope of applications for a more comprehensive support of business transactions. Newly developed EDI systems provide SMEs with various opportunities to be involved in EDI trading system. This might mean a loss of business for VANs. As more and more businesses get Internet connections and start using the Internet for transmitting EDI messages, this may lead to a re-evaluation of the role of VANs and a redefinition of their value-adding strategies.

Despite the remarkable accessibility and lower cost of Internet-based EDI, security and reliability issues still remain disputable, especially in the absence of a third party. Since no single commercial organization is responsible for the Internet, no one can be held accountable for its reliability. The importance of security and reducing the risk of fraud and unauthorised access will increase significantly with the growth of the number and volume of international commercial transactions over networked computers. These security issues will lead to a number of business segments that might be covered by VANs, which provide their clients with additional security and new services by using the Internet's technology.

Table 1 provides a comparison of various EDI systems and their applicability to the small to medium sized shippers.

## 5. International Cooperative Works for the Secure Electronic Commerce Solutions

A number of organizations at intergovern-



Table 1 Comparisons between various EDI systems

	Disadvantages	Advantages
Classical EDI	High cost for integration Dependent upon dominant trading partners for software and VAN selection	Providing reliable and secure transaction
Web-based EDI	Less than secure than VANs	Providing fast and cost effective transactions Easier implementation
XML/EDI	Unknown	Enabling sharing resources Easier implementation and cost effective for use
Simpl-EDI	Integration cost and some dependence upon dominant trading partner	Retain major accounts Cost effective transaction Easy to use
Forms-EDI	Unknown	No additional investment required Low cost transaction and easy to use
Lite-EDI	Unknown	No full EDI system implementation required Cost effective transactions and easy to use

mental and private sector levels have worked together to provide international solutions to the emerging electronic commerce environment. A number of conferences and events involving governments, private sector and international organizations have been held.

Electronic commerce-related issues were discussed during the G7 ministerial conference in

Brussels (February 1995), UNCITRAL (United Nations Committee on International Trade Law) adopted a Model Law on Electronic Commerce in 1996, the Bonn Ministerial conference (July 1997), the ITU (International Telecommunications Union) Telecom Interactive event in Geneva (September 1997), the ISO Global Standards Conference in Brussels (October 1997), the OECD conference in Turku (November 1997), the TABD (Trans-Atlantic Business Dialogue) in Rome (November 1997), the Council of Europe Ministerial conference on Mass Media Policy (Thessaloniki, December 1997) and APEC summit (Asia-Pacific Economic Cooperation) at Vancouver November 1997, EU-US summit (Washington, December 1997), and EU-Japan (Tokyo, January 1998) summit.

Much work has already been achieved within the WTO (World Trade Organization), notably Agreements on Information Technology Agreement (1996) and Basic Telecom Services (1997) which will contribute to the development of favourable conditions at international level for electronic communications and commerce. In addition, the second WTO Ministerial Conference in May 1998 adopted a Declaration on Electronic Commerce that requires the General Council to establish a comprehensive work program to examine all trade-related issues relating to global electronic commerce by its next meeting. The Ministers also declared that member states would continue their current practice of not imposing customs duties on electronic transmissions and the taxation of commerce conducted over the Internet should avoid inconsistent national tax jurisdictions and double taxation.

The International Chamber of Commerce (ICC) has also been heavily involved in trade

facilitation in co-operation since the 1950s. With the rapid development of EDI, the ICC revised Incoterms. In 1953 the member countries of the ICC formulated a set of international rule for the interpretation of trade terms and published them in booklet Incoterms 1953, which has since been updated. clauses to support its widespread use. In September 1987, the ICC Executive Board adopted the UNCID (Uniform Rules of Conduct for Interchange of Trade Data by Teletransmission) rules, which aims at facilitating the interchange of trade data effected by teletransmission, through the establishment of agreed rules of conduct between parties engaged in such transmission. Recently, ICC launched Electronic Commerce Project (ECP) which includes an electronic repository of legal terms applicable to electronic transactions, a self-regulatory framework for electronic trade payments, self-regulatory rules and practices for digital authentication and verification for secure electronic transactions and model click-wrap international trade contracts for use on the Internet (UN/ECE, 1997c). The project drafted General Usage for International Digitally Ensured Commerce (GUIDEC) to provide a set of common definitions and business-generated best practices for certifying and ensuring electronic commerce.

In 1997, OECD has put forward Guidelines on Security and on Cryptography so that governments can develop their own national policies in ways that are compatible with other countries'. The OECD held a Conference at Turku, Finland in November 1997 to discuss the problem areas where government or international organization involvement may be required in order to reduce some of the barriers and

uncertainties that plague the development of electronic commerce (OECD, 1997). The conference reached a broad consensus on the proper role of the public and private sectors. Only where the market cannot work out the problems should government take action and that action should be specific, precise and transparent.

European Commission is also actively engaged in electronic commerce to provide a favourable regulatory framework. The Commission launched an Electronic Commerce Initiative to foster a favourable business environment by promoting adequate skills and by making consumers and industry aware of the opportunities offered by electronic commerce. This Initiative provides a coherent framework for these mutually re-enforcing technological, regulatory and support actions to facilitate the development of the electronic commerce market whilst adequately safeguarding public interest objectives. Fifth Framework Programme (1998-2002) is another EUs project for the convergence of information and communication technology, i.e, Information Society Technology (IST). One of the major objectives is to enable European workers and enterprises, in particular SMEs, to increase their competitiveness in the global marketplace, whilst at the same time improving the quality of the individual's working life through IST.

Throughout the world SMEs are important as the foundation of economic activities and the key to innovation and job creation. For example, SMEs play a major role in the Korean economy, making up 99% of all enterprises in the manufacturing sector and account for more than 70% of manufacturing sector employment in 1997. As a whole they currently contribute most

of the private sector employment growth in South Korea. This was acknowledged by the G7 Ministerial conference on Information Society in February 1995. As a consequence G7 members launched a project A Global Marketplace for SMEs to facilitate increased competitiveness and participation in global trade for SMEs through the use of electronic commerce technologies.

SWIFT (Society for World International Financial Telecommunications) which handles most of the electronic funds transfer for banks, and the TT Club (Through Transport Mutual Assurance Association) whose members are drawn from the multi-modal transport industry or transport intermediaries launched Bolero project. The objective of project is to provide guaranteed and secure delivery of electronic form of trade documentation globally. The key element is the bill of lading as a unique trade document for the electronic transfer of title for documents. Three working parties look at the commercial, technical and legal aspects of this particular area of electronic trade. The Bolero system is open for both structured electronic documents such as UN/EDIFACT and unstructured messages such as e-mail. The system uses digital signature technology to make sure that the same bill of lading can not be duplicated. The service is governed by BRS (Business Requirements Specification) which describes the concepts and business requirements for the Bolero approach to electronic trade document management.

SITPRO (The Simpler Trade Procedure Board) is dedicated to encouraging and helping businesses trade more effectively and to simplify the trading process within the procedures and documentation associated with international trade. Recently, SITPRO launched the Aligned Doc-

uments and Electronic Equivalents Project (ADEEP) to focus the two main ways of handling and transmitting data for international trade; the use of SITPRO developed UK Aligned Documents System and the use of EDI. SITPRO sees that paper document will still be used in the international trading system into the next millennium despite the rapid developments in information technology. Thus, the project team is trying to design and deliver a process including aligned documents, standards and electronic support to allow traders to provide and use compatible paper and electronic documents at any point in the international trade transaction. With the rapid emergence of Internet, ADEEP initiative is looking at to develop electronic forms for the Internet so that SMEs can easily and at low cost fill in forms on their PC that can arrive at the recipient as an EDI message.

## 6. Conclusion

On the edge of the new millennium, small businesses as well as their customers are confronted with major challenges. While large companies tend to adopt new ideas profitably, most small businesses lack resources and time to become acquainted with the emerging opportunities in this field. For reasons of cost and complexity, EDI has not been significantly taken up and used by small to medium sized shippers.

With the arrival of the Internet, however, the pattern of electronic commerce has dramatically changed. In particular, the Internet-based EDI will introduce many new ways of trading and allow the interaction between trading partners that previously could not economically afford to

trade with one another. The newly developed systems make EDI affordable even to small to medium sized shippers by reducing implementation and transaction costs. It is expected that a wide diffusion of EDI system will come true as new developments of EDI will bring lower cost and easy use, no matter the size of organizations.

There is no doubt that the electronic commerce, including EDI, will have a positive impact on the global economy by bringing about radical changes in the economic structure, and also by promoting economic expansion and the creation of new industries. To survive in an increasingly competitive world, businesses must realize the importance of electronic commerce technology and must adapt themselves successfully to the new economic environment through improvements in the organization's competitiveness and business performance.

It is time for small to medium sized shippers to look to the future, and the future is electronic commerce. It is also urgent for port authorities to provide better EDI environments to shipping and port community. Implementation of newly developed EDI systems can be a solution to widen the scope of EDI involvement.

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