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Electronic Data Interchange - A Management Overview
(Electronic Commerce Initiatives)

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Submitted by the Economic and Social Commission for Asia and the Pacific *

This document is being presented within the content of joint work on the promotion of UN/EDIFACT in joint ECE/ESCAP member states being undertaken by the ECE and ESCAP secretariats.

The Group of Experts is invited to:
- Review and comment upon this document.
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1.1 Introduction

Increasing cost and competition in global trade have led to a search for efficient, cost effective techniques, particularly through the application of computer and communication technologies. The increasing use of Electronic Data Interchange (EDI) in the conduct of international trade and transport by the developed countries in the past years, is a testimony to this fact.

Through EDI, not only can business transactions be streamlined and speeded up, but also the market places can be expanded through the use of network systems between companies.

The use of EDI has been on the rise in many countries in the world. However, for most countries in Asia, awareness of EDI and its benefits is still relatively low. There is hence a pressing need to promote awareness of EDI and to educate businesses in this part of the world on how to incorporate EDI in their business strategies.

1.2 Objectives

Against this background, the Economic and Social Commission for Asia and the Pacific (ESCAP), in collaboration with the Asia EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport) Board, has prepared this report to provide businesses with a clear understanding of the benefits that can be derived from introducing EDI, the environment and factors leading to successful implementation of EDI and how successful EDI implementation should be managed.

On a broader scale, the objective is to increase trade efficiency in the region by facilitating greater use of electronic commerce in general and EDIFACT standards in particular.

1.3 Course structure

The report is structured into eight chapters:

Chapter 1 gives the background of the training programme and introductory information on ESCAP and the Asia EDIFACT Board.

Chapter 2 introduces the definition, concepts and benefits of EDI.

Chapter 3 discusses EDI standards; the need for standards and in particular the UN/EDIFACT standard.

Chapter 4 introduces the concepts of a Value Added Network (VAN) and the services they provide in the area of EDI.

Chapter 5 surveys EDI security and legal issues.

Chapter 6 provides an overview of current EDI developments in some of the Asian countries.
Chapter 7 discusses the right environment for a successful EDI implementation.

Chapter 8 summarizes the steps leading to a successful EDI implementation and the key success factors.

1.4 Economic and Social Commission for Asia and the Pacific

The Economic and Social Commission for Asia and the Pacific (ESCAP) was established on 28 March 1947 by the Economic and Social Council of the United Nations.

The principal role of ESCAP is to initiate and participate in measures for facilitating concerted action for the development of Asia and the Pacific, including the social aspects of such development, with a view to raising the level of economic activity and standards of living, and for maintaining and strengthening the economic relations of countries and territories in Asia and the Pacific, both among themselves and with other countries in the world.

Over the last decade, the activities of ESCAP have been greatly expanded in response to the expressed needs of Member States. New areas of priority include the promotion of intra-regional trade and investment, the transfer of technology, privatization and entrepreneurship, environment, urbanization, poverty alleviation, drug abuse control, population, social development, and labour migration.

The in-house multidisciplinary capability of ESCAP provides for a wide range of technical assistance, focusing chiefly on direct advisory services to Governments and the training and pooling of regional experience and information through meetings, publications and intercountry networks. ESCAP executes a wide range of programmes and projects to stimulate growth, improve socio-economic conditions and help build the foundations for a modern society.

CHAPTER 2 Electronic Data Interchange (EDI)

2.1 Paper communications: the traditional way

Business documents are traditionally printed from the data stored in the computer and despatched by courier or mail services.

To illustrate, a purchase order, printed from the customer system, would be sent by mail to the supplier. On receipt, the supplier would input the order into his computer system and generate an invoice to be sent to the customer by mail. On receipt of the invoice and the goods ordered, the customer would input the invoice details into his computer system and initiate payment by cheque to the supplier by mail.
This conventional paper-based system is slow as it takes a long time to turnaround documents through the mail. It is also error prone as mail could be lost, damaged, mis-delivered or mis-sorted. Besides, errors could easily be introduced when the data from one computer system is keyed into another computer system. For the organization, the process is laborious and wasteful on resources as it requires repetitive handling of a large volume of paperwork and re-entry of data from one computer system into another.

2.2 Electronic communication: the new way

To avoid the cost and the problems associated with paper handling, organizations have looked into the possibility of linking their computer systems directly to communicate and send business data. This concept of computer-to-computer link for the sending and receiving of business documents, such as invoices and purchase orders, is known as Electronic Data Interchange, or in short, EDI.

EDI eliminates the process of sending and receiving documents through the postal system. It also enables data which is sent or received to be processed directly from the computer system without having to re-key in the data.

2.3 Definition of EDI

Electronic Data Interchange is defined as the direct transfer of business information between computer systems in different organizations (without human intervention) using widely agreed standards to structure the transaction or message data. With a structured message, such as a purchase order, the data is formatted according to an agreed standard, thus facilitating the electronic transfer from one computer system to another.

This transfer of information is characterized by certain features which makes it particularly attractive to use:

(1) Data is between external organizations (such as a supplier to a manufacturer or retailer) and entered once and verified at source;
(2) The exchange is machine to machine with little or no human intervention, eliminating paper handling and postal delays;
(3) The transaction forms and data definitions are standard so that the computer does not have to generate different formats of the same form for different trading partners.

2.4 Benefits of EDI

The advantages of EDI are many:

(1) Saves effort
The conventional paper-based system of business communication is slow and laborious. With the adoption of EDI, documents prepared in one document system can be transmitted electronically to the trading partner's computer system. Through this method of communication, there is instantaneous transfer of information from source to destination with minimal manual intervention.

(2) Saves time
EDI transactions are instantaneous, enabling organizations to plan their production schedule, thus saving costs. Organizations need not rely on the conventional mail system to deliver documents.

(3) Reduces errors
The conventional paper-based system is error-prone as mail could be lost, damaged or wrongly delivered. Reduced data-entry also reduces the number of mistakes.

(4) Reduces cost
With EDI, costs associated with paper handling, data entry, transcription, manual sorting, filing, reconciling, mailing and lost mails are eliminated.

(5) Improves customer service
With an improved environment, more streamlined communication and faster turnaround time, organizations are able to respond more rapidly to their customers' requirements, hence improving productivity, customer service and business competitiveness.

(6) Expands business opportunities
EDI offers organizations an opportunity to expand their business operations beyond their existing circles. Inter-connection of network to other networks is possible so that organizations will be able to communicate not just to business partners linked to the same network, but even to business partners linked to other networks.

2.5 EDI software components

Typically, EDI software would consist of the following three components:

2.5.1 Application interface software
The application software often vary in complexity depending on users' requirements. It is often designed as a simple data entry package on the PC platform to allow users to key in data to be transmitted. Often, customised routines are incorporated to perform data validation and interdependency checks so as to ensure data accuracy and completeness.

2.5.2 Translation software
The translation software is the prevalent component in the EDI software. There are many such software in the market. The purpose of
the translation software is to convert data from the in-house format into the agreed EDI standard before transmission. And for incoming data, this software converts the data from the EDI format to a format suitable for the in-house system.

Another main feature of the translation software is that during the conversion process, it automatically performs data compression, optimising data transmission efficiency.

The choice is largely dependent on the EDI standards to be adopted. Some companies may choose to develop the translation software in-house.

2.5.3 Communication software
The main function of the communication software is to support linkups to different network systems. Within the communication software, there are usually utilities that will enable users to specific parameters required for the EDI connection, such as network system logon number, communication port number etc.

2.6 Interactive EDI

Traditional EDI systems are designed to support EDI implementation in the batch mode. The message mechanism often operates on a store-and-retrieve manner. Users need only to connect to the network when they wish to send or receive documents.

However, the nature of some business applications, such as air travel bookings, cargo space booking etc, requires more immediate response from the corresponding EDI partners’ computer system. In such instances, the traditional batch-mode EDI does not suffice – interactive EDI is needed.

Transactions between interactive EDI applications are basically modelled in traditional request/response transaction processing systems. Interactive EDI implies active cooperation between two or more systems at the time of interaction, and the use of a single message pair or a series of message pairs.

CHAPTER 3 EDI standards – UN/EDIFACT

3.1 The need for EDI standards

Just as voice communications requires a common set of rules which everyone understands and uses to communicate with each other, the use of EDI requires a common set of standards to be accepted for communication.

The transmission syntax defines the rules for transmitting information between computers; the data element specifies the meaning, codes and computer format of the information to be exchanged and the message specifies the data elements contained in the document to be interchanged. These compare closely with grammar, vocabulary, abbreviations and sentences that we use in verbal communication.
3.2 History of EDI standards

In the early days of EDI, electronic messages formats were designed to meet the needs of individual organizations. The companies connect their computers together based on proprietary standards. It was not long before these companies realized the limitations of such proprietary standards. They saw the need to communicate not only with their trading partners but with other players within the industry.

Industry standards were then developed to meet the needs of wider communities of interest. For example, standards, such as ODETTE (Organization for Data Exchange by Teletransmission in Europe), were developed specifically for all players in the automobile industry, TradaNet standards catered to the retail industry in the United Kingdom of Great Britain and Northern Ireland.

Even with industry standards in place, organizations involved in cross-industry trading still faced a number of barriers, and consequently the need for national standards became apparent. Two national standards emerged. They were the ANSI ASC X12 (American National Standards Institute Accredited Standards Committee) in North America and GTDI (Guidelines for Trade Data Interchange) in Europe.

Although these different national standards generally meet the domestic needs, they nevertheless were creating difficulties for international transactions. Trying to resolve this barrier for international communication, several countries brought this problem to the attention of the United Nations Working Party on the Facilitation of Trade Procedures (UN/ECE/WP.4), a committee responsible for streamlining procedures and developing standard documentation.

September 1985 saw the bringing together of the GTDI and ANSI X12 standards. The UN-JEDI (Joint Electronic Data Interchange) group was formed to develop an international standard. This co-operation led to the birth of UN/EDIFACT (or the United Nations Electronic Data Interchange for Administration, Commerce and Transport).

3.3 The UN/EDIFACT standard

3.3.1 Framework

The concept of EDIFACT revolves around a single international standard flexible enough to meet the needs of government and private industry. UN/EDIFACT is fast gaining recognition and acceptance as the global EDI standard.

EDIFACT defines the syntax rules for the transmission of messages and can be used across industries, across country boundaries and for both government and private sectors. EDIFACT is fast gaining popularity in the United States of America, Europe, Australia, New Zealand and Asia.

EDIFACT covers standardization in five main areas:
(a) The syntax rules;
(b) The data elements;
(c) The segments;
(d) The messages;
(e) The codes.

3.3.2 Syntax rules

The syntax rules are rules governing the structure of an interchange and its functional groups, messages, segments and data elements. The rules apply only to data to be interchanged. It is independent of the type of computers, applications, communications protocols and interchange media to be used.

The UN/EDIFACT syntax was recognized by the International Organization for Standardization (ISO) and the Economic Commission for Europe (ECE).

3.3.3 Data elements

Data element is the very basic building block which equates to a word or a group of words in a sentence. It is the smallest unit of information within a message. It can be identified by the unique four-digit identification tag, data element name, data description and representation.

3.3.4 Segment

Segment is the immediate unit of information in a message which equates to sentences in a passage. A segment consists of a pre-defined set of functionally related data elements which are defined by their sequential positions within a set. Each segment is identified by a three-alphabetical segment tag.

3.3.5 Messages

Messages are composed of logically grouped segments required for the type of message transaction covered. Messages are equivalent to documents. For example, an invoice in EDI form would be known as the Invoice message. Messages can be defined by a message specification which is uniquely identified by the message type and message version number.

3.3.6 Codes

Codes are used as abbreviations. The UN/EDIFACT codes are built upon the existing ISO codes, such as country codes, location codes, codes for modes of transport, codes for units of measurements, codes for container movements, codes for package names and codes for incoterms.

3.4 Benefits of UN/EDIFACT

The benefits of UN/EDIFACT are many:
EDIFACT is a fusion of European and American national standards. Generally, EDIFACT retains the essence of the two national standards characterized by its flexibility and efficiency while not compromising its functionality;

EDIFACT is flexible enough to be used across industries and across boundaries for both government and private sectors in a wide range of EDI applications;

EDIFACT is also supported by a set of rigorous messages design procedures, thus ensuring that EDIFACT messages which are endorsed by the United Nations conform fully to the standard and hence are internationally functional.

The essence of a good standard does not lie only in its flexibility, efficiency and functionality. Its acceptance is of paramount importance. EDIFACT is fast gaining popularity not only in the United States and Europe, but also in Australia, China, India, Japan, Malaysia, New Zealand, Republic of Korea, Singapore, as well as in many developing countries in the Asia and Pacific region. EDIFACT is the prevailing global EDI standard.

3.5 Organizational structure of UN/EDIFACT

With the birth of UN/EDIFACT, the Economic Commission for Europe (ECE) was appointed to administer the standard. Two groups of experts under the ECE Working Party 4 (WP4) emerged. Group of Experts 1 (or more commonly known as GE.1) oversees data element and automatic data interchange developments; and Group of Experts 2 (GE.2) deals with procedures and documentation.

For the international development of EDIFACT standards, the GE.1 appoints individuals called rapporteurs to set up appropriate machinery and facilities to develop EDIFACT standards in the respective regions. These UN/EDIFACT rapporteurs are nominated by their respective Governments and appointed by WP.4. Rapporteurs are appointed to co-ordinate regional activities in the areas of message development, technical assessment as well as promotion and documentation.

The first rapporteurs were appointed for North America, Western Europe, and Central and Eastern Europe in 1987. ECE appointed UN/EDIFACT rapporteurs for Australia/New Zealand and Japan/Singapore in 1991 and the African rapporteur was appointed in 1993.

Regional EDIFACT Boards (for example, Asia EDIFACT Board, Australia/New Zealand EDIFACT Board) are appointed locally to support the rapporteurs in the execution of their responsibilities. Their constitution is not regulated by WP.4 which allows for regional differences in geography, language and political environment.

In summary, the organization structure of UN/EDIFACT is as depicted in the diagram below:
3.6 UN/EDIFACT messages

A message, a structured set of data values relating to a business function, is a collection of sequenced segments within a defined section. United Nations Standard Messages, the product of the UN/EDIFACT development process, are collections of data values conveying general business functions, applicable to all needs ( multisectoral).

UN/EDIFACT classifies messages in three categories:

Status 0
This is a message which is still at draft form, submitted to ECE/WP.4 for information only.

Status 1
This is message which has been approved by ECE/WP4 for formal trial.

Status 2
This is a recommended draft that has been approved by WP.4 as a formal recommendation. Messages in this category are known as United Nations Standard Messages (or in short UNSMs).

Within each document status 0-2, there may be many revisions.

3.7 UN/EDIFACT publications

3.7.1 International publications

The set of UN/EDIFACT documentation is published and maintained by ECE/WP.4 and the International Organization for Standardization (ISO).

This documentation forms a set of internationally agreed standards, directories and guidelines for the electronic interchange of structured
data, and in particular, data relating to trade in goods and services, between computerized information systems.

Within the context of UN/EDIFACT, the major relevant documents are:

(a) Guidelines & Rules;
(b) ISO 9735 Syntax Rules;
(c) The UN/EDIFACT Syntax Implementation Guidelines;
(d) The UN/EDIFACT Message Design Guidelines;
(e) UNTIDID (The United Nations Trade Data Interchange Directory) for status 2 messages which includes:
   (i) EDMD - the EDIFACT message directory
   (ii) EDSD - the EDIFACT segments directory
   (iii) EDCD - the EDIFACT composite data element directory
   (iv) EDED - the EDIFACT data element directory
   (v) EDCL - the EDIFACT code list directory
(f) UN/EDIFACT Working Directory Set (for status 1 messages).

UN/EDIFACT directories are published twice a year by the United Nations and are distributed through the regional EDIFACT Boards and local EDIFACT Committees. Any parties interested in obtaining copies of the documents are advised to contact their local EDIFACT Committee or the regional EDIFACT Board.

3.7.2 Country-level publications

UN/EDIFACT participating countries also publish country directories based on the particular country's need such as the language and level of technical development.

For example, in China, a Chinese version of the directory sets was developed to cater to the needs of the local message designers. In the Republic of Korea, a Korean version of the directory was developed. In Singapore, the SGD (Singapore EDIFACT Directories) was developed, in which new or amended segments, data elements and codes for local EDI systems form part of the directory sets.

3.8 The Asia EDIFACT Board

3.8.1 Mission of the Board

The Asia EDIFACT Board, or ASEB in short, was formed with the mission to guide, stimulate and promote the development and use of the UN/EDIFACT standards in its member countries or economies.

ASEB is the representative body taking care of all EDIFACT matters in this region.

3.8.2 Members of ASEB

Over the last five years, the Board has been greatly expanded. It now has ten participating countries:
In addition, Hong Kong has been participating in ASEB meetings and activities since 1990 as "observer" economy.

The contact point for each member/observer country/economy of ASEB is attached as Annex I of this document.

3.8.3 ASEB organization structure

The ASEB organization structure is as follows:

3.8.4 ASEB Joint Working Groups

Joint working groups are established under ASEB to promote the sharing of information and expertise among member countries and to represent the joint interests of the Asian countries at United Nations meetings.

A total of nine joint working groups have been established under ASEB:
(1) Education and awareness joint working group (AS AEG)
   The AS AEG was set up to promote and encourage the use of EDI and EDIFACT in Asia by assisting ASEB to organize and develop relevant educational and promotional programmes.

(2) Technical assessment joint working group (AS TAG)
   The AS TAG was set up as the technical consulting group to support ASEB on the technical aspects of EDIFACT messages development and to assess messages developed by the various working groups for structure and syntax conformance.

(3) Security joint working group (AS SWG)
   The mission of the AS SWG is to serve as a task force for the development and promotion of UN/EDIFACT security within and among member countries/economies.

(4) Financial joint working group (AS FWG)
   The mission of the AS FWG is to stimulate the joint application of EDI and EDIFACT among the banks in the member countries.

(5) Sea Transport joint working group (AS TWG - sea)
   The mission of the AS TWG (sea) is to stimulate the joint application of EDI and EDIFACT in the maritime transport sectors of the member countries.

(6) Air Transport joint working group (AS TWG - air)
   The mission of the AS TWG (air) is to stimulate the joint application of EDI and EDIFACT in the air transport sectors of the member countries.

(7) Customs joint working group (AS CWG)
   The AS CWG focuses on the electronic communication requirements between the trading community and the customs/trade departments in the various member countries.

(8) Purchasing joint working (Retail/Distribution) (AS PWG)
   The AS PWG (Retail/distribution) looks into developing and promoting the use of UN/EDIFACT messages for the retail/distribution sector.

(9) Purchasing joint working (Electronics & Computer Group) (AS ECG)
   The AS ECG is set up to develop and maintain a set of standard messages to facilitate EDI in the electronics manufacturing sector.
CHAPTER 4 VALUE ADDED NETWORKS (VAN)

4.1 Introduction

To avoid all the paperwork handling and mailing problems and rekeying overheads, companies have looked into the possibility of EDI - that is the connecting of their computer systems to send business data directly from computer to computer after having agreed on the sorts of paper (invoice, purchase orders, bills of lading etc) to be exchanged and the data and format for the exchange.

While this has solved the problem of overheads, the application of EDI could in fact lead to a complex web of communication lines connecting each company to its trading partners, and result in the use of many formats.

Companies also need to contend with the issue of connecting their computer systems to computer systems of different makes which their trading partners may use. Companies could face a long lead time in developing custom-made connections to each of its trading partners.

The concept of a clearing house, through which computers would transmit documents electronically has therefore evolved. Value Added Networks (or in short VAN) emerged to serve as the clearing houses.

4.2 Definition of VANs

The definition of VAN can be taken as "those which add value to the basic telecommunication networks in order to provide a more cost effective service". It is not unusual that the "VAN market" in many countries, including Asian countries, is regulated by the telecommunication authorities; these authorities grant licences to companies operating VANs.

Most VANs in many countries offer, besides EDI services, a suite of other complementary services, including electronic mail, on-line databases, electronic funds transfer services etc.

VANs play a key role in EDI implementation in many countries as they have both the resources and expertise needed to set up direct communications links with each of the trading partners. VANs also provide a host of support facilities, such as audit trail, translation of EDI standards and implementation support.

The role of VANs, the services they offer, how to select a VAN, when to use a VAN etc, are some issues which we will deal with in this chapter.
4.3 The role of VANs

VANs undertake the role of a middleman in the channel of EDI communications. Often referred to as the "electronic postman", VANs offer services to connect all parties so that EDI users need only establish one single connection with the VAN in order to communicate electronically to all other parties connected to the VAN. In other words, VANs eliminate the need for computer systems to be connected to a multitude of other computer systems in order to send and receive EDI messages.

In so doing, VANs also eliminate the problem of incompatible systems not being able to connect to each other. For example, a VAN would support all platforms of computer systems, mainframes, minicomputers, personal computers of all makes - IBM, HP, DEC, UNIX etc. In a situation without a VAN, it would not be easy for an IBM personal computer to communicate electronically with a DEC minicomputer. With a VAN as the middleman, both the computer systems need only connect to the VAN, which supports both interface requirements.

The role of VANs can be outlined as follows:

1. VANs act as clearing houses;
2. VANs perform mailbox and network management;
3. VANs offer translation capabilities from one EDI format to another;
4. Most VANs provide a host of complementary services, such as electronic mail, electronic funds transfer, database access etc;
5. Most VANs offer communications capability round the clock;
6. Most VANs also provide technical consultancy and support in EDI applications.

4.4 Network features of VANs

VANs generally provide the following network features:

1. Password management
   ...manages the passwords of users within your account.
2. Access management
   ...manages network and application access for authorised users only.
3. Communications management
   ...offers delay transmission and redial facilities as well as recovery/restart support.
4. Problem management
   ...offers round-the-clock facility for users to report, track and resolve problems.
5. Status monitoring facility
   ...monitors usage status of network users within your account.
6. Broadcast facility
   ...enables users to disseminate information to others.
7. Mail facility
   ...offers electronic mail services.
8. Message archival
   ...permits users to store messages and access by message reference or date.
9. Message acknowledgement
   ...provides various types of systems delivery and receipt
acknowledgements.

10 EDI standards
...supports a wide array of open and proprietary EDI standards.

4.5 Types of VANs

VANs can be generally classified into three broad categories depending on the scope of services offered:

**Industry/application-specific VANs**
These are mainly focused on a specific industry or sector. They have a focused market of users in the specific industry/sector and offer value added services to meet the needs of those parties.

**National VANs**
These are set up to take care mainly of electronic communications for a broad spectrum of parties within the countries' geographical boundaries. National VANs are very prevalent in the Asian region.

**Global VANs**
These span across country boundaries and often position themselves as focusing on providing services for inter-country communications as opposed to intra-country communications more often taken care of by national VANs.

4.6 Trends of VANs in Asia

For most Asian countries, EDI has been introduced in a big way only in the last five or six years. There are two prominent trends of VANs in these countries.

In Asian countries, the Government usually plays a big role in the promotion and implementation of EDI. This is significantly different from the developments in the western countries, whereby the private sector impetus to EDI is very strong. This can be attributed to the fact that it has been recognised that EDI can be used as a springboard for a country's economic growth.

As EDI in Asian countries is very much Government-led, there is a general trend towards the setting up of national VANs, in most cases with government participation, either directly or indirectly. This is evident in countries such as Malaysia, the Republic of Korea, Singapore etc.

As international trade plays a key role in the economic development of the Asian countries, one can also observe that the first EDI application implemented in these countries is likely to be that in the international trade sector. Singapore implemented TradeNet as the first nationwide EDI application. Malaysia set off the EDI "fire" with DagangNet ("Dagang" in the Malay language translates to "trade").
4.7 Selection of VAN

Through these years of EDI developments, many VANs have been set up. How would you decide which VAN is most suited to your EDI needs? First of course, you would need to determine the unique features and requirements of your EDI application. However, there are several basic factors which you can consider in the selection of a VAN. These are:

1. **Speed**
   - how long does it take for your business partner to receive the EDI message you sent out?

2. **Userbase**
   - are your EDI partners using the same VAN? Is the VAN able to reach out to all your business contacts within your EDI program?

3. **Reliability**
   - does the VAN have a good record of reliability? Does it have a workable disaster recovery plan?

4. **Support**
   - does the VAN provide you with 24-hour customer support?

5. **Reporting and inquiry capabilities**
   - does the VAN provide an audit trail of all your EDI transactions?

6. **Communication access**
   - does the VAN support a wide array of computer linkages?

7. **Mailbox access**
   - does the VAN enable you to send to a mailing list of parties with one single message?

8. **Standards support**
   - does the VAN support both proprietary and open standards?

9. **Security**
   - does the VAN support critical security features such as passwords, encryption and message authentication?

10. **Complementary services**
    - does the VAN offer complementary services such as E-mail, fax gateways etc?

11. **Cost**
    - and finally, of course, does the VAN offer you a cost-effective solution?

CHAPTER 5 EDI security and legal issues

5.1 EDI security

The types of security controls networks should have are crucial when your organization adopts EDI as you and your trading partners are entrusting some of your most crucial and confidential data to the network.

Securing an EDI system is much like securing any kind of computer network with this difference: EDI extends to more than one company. Not only must organizations make sure their system is secure, but their trading partners
must all do the same.

A full EDI security system should include three levels of security:

(1) Network level security
This level of security basically screens users accessing a particular network. With a set of account/user identification codes coupled with the corresponding passwords, authorized users will be able to log into the network and to perform transactions (that is, sending and receiving of EDI messages) across the network. This level of security ensures that users not registered in the EDI network are not able to gain access to its facilities.

(2) Application level security
Beyond network security, application level security can also be put in place. This level of security is usually controlled by the individual front-end EDI application (or software).

In any given EDI application or software, there might be some data you are not allowed to see, some you can see but not alter, some to which you can add information and some where you can change existing information. Application level security makes use of passwords to admit different categories of users to the different levels of application to which they can gain access. For example, a clerical staff may only be given authority to key in data in an electronic purchase order but not the authority to send the EDI document to the supplier. A higher level managerial staff may hold a password which allows him to view the data keyed in by the clerical staff, make the necessary corrections and send the document out.

A system administrator is usually appointed to oversee the EDI application to maintain a system that both identifies the data and monitors which password holders shall be given and to decide on the kind of access to the system.
(3) Message level security

Message level security can also be put in place to combat unauthorized disclosure of message content, non-bona fide messages, duplication, loss or replay of messages, deletion of messages and repudiation of message responsibility by its sender or its receiver. To counter these, EDIFACT has in place several methods of message-level security:

(i) **Encryption**

The idea of data encryption is that data, whether on screen or as ASCII within a computer system, can be totally enciphered by a transmission process, and on receipt by an authorized user can be reconstituted into its original format.

This method of security is used to ensure confidentiality of contents and protects against unauthorized reading, copying or disclosure of message content.

(ii) **Message authentication**

Message authentication, or a MAC (Message Authentication Code), can be applied to a whole message or only part of a message.

The idea behind the MAC process is to ensure that only authorized senders and receivers correspond and that no one is impersonating another correspondent.

(iii) **Message sequence numbers**

Message sequence numbers are used to protect against duplication, addition, deletion, loss or replay of a message.

(iv) **Hashing**

Hashing is a technique used to protect against modification of data.

Message content integrity can be achieved by the sender including with the message an integrity control value (or known as hash value). The receiver of the message computes the integrity control value of the data actually received using the corresponding algorithms and parameters and compares the result with the value received.

(v) **Digital signatures**

Digital signatures protect the sender of a message from the receiver’s denial of having received the message. The use of digital signatures can also protect the receiver of a message from the sender’s denial of having sent the message.

Protection can be achieved by the sender by including a digital signature with the transmitted message. A digital signature is obtained by encrypting, with an asymmetric algorithm. The digital signature can be verified by using the public key which corresponds to the secret key used to create it. This public key may be included with the interchange agreement signed by the parties.
Protection can be achieved by the receiver sending an acknowledgement which includes a digital signature based on the data in the original message. The acknowledgement takes the form of a service message from the receiver to the sender.

The use of digital signatures provides not only non-repudiation of origin and receipt, but also message content integrity and origin authentication.

5.2 EDI legal issues

5.2.1 Framework

The legal issues which are fundamental to any business relationship must also be resolved prior to EDI implementation. The legal aspects of EDI can be divided into two areas:

(1) A national legal framework which allows for documents transmitted electronically via EDI to be legally binding;

(2) A contractual arrangement between EDI partners to agree on terms under which EDI documents will be considered legally binding and acceptable.

5.2.2 UNCID

The Uniform Rules of Conduct for Interchange of Trade Data by Teletransmission (UNCID) published by the United Nations contains the introductory note and text of the Uniform Rules of Conduct.

This document is developed by a special committee with participation from CCC, ISO, ODette, ECE, UNCITRAL etc. It provides a foundation on which the parties involved in electronic communication can build a communication agreement - a contract with legally binding effect.

The UNCID has 11 articles which should be addressed by any interchange agreement:

(1) Objective
(2) Definitions
(3) Application
(4) Interchange standards
(5) Care
(6) Messages and transfers
(7) Acknowledgement of a transfer
(8) Confirmation of content
(9) Protection of trade data
(10) Storage of data
(11) Interpretation.

A copy of UNCID is attached in the annex II for reference.

CHAPTER 6 EDI in Asia

6.1 Introduction

The countries in Asia are witnessing rapid economic growth. Seen as a region with the highest potential for development and growth, it offers itself
as an attractive production base and a potential market where the manufacturing costs are low and the markets are growing. The growth of many of the Asian countries has in fact been characterized by rapid industrialization and growth of their export markets.

One of the trends which has clearly emerged among some of the Asian countries is the use of EDI for the growth of their economies. They have taken the first step in setting up national networks that are targeted to improve the efficiency of business transactions through the handling of trade documentation electronically. Most of these countries have targeted their first EDI applications in the area of international trade, to enhance trade efficiency.

The community trading networks such as TradeNet in Singapore, TradeVan in Taiwan Province of China, KTNet in the Republic of Korea, TradeLink in Hong Kong and DagangNet in Malaysia all share a common objective - to expedite the flow of goods by automating the process of permit approvals and payments.

There is also an increasing interest among these networks to interconnect to each other and to process electronically the trade documentation between trading partners in each country.

This chapter aims to provide an overview of the EDI developments and status of VAN operations in these countries and focus on some of their major EDI projects, user base, market size and standards activities.

6.2 China

As with many countries in Asia, China's efforts to adopt EDI is orchestrated by the Government. Its initial focus is clearly in the area of trade and customs applications.

To promote the use of EDI and development of UN/EDIFACT messages, the China EDIFACT Committee has set up a number of local and industry-oriented subcommittees in Guangdong and Shanghai.

Chinese companies such as the China Ocean Shipping Company (COSCO) and Shangdong Artex Company have linked up with their overseas trading partners through GEIS.

6.3 Hong Kong

Hong Kong's EDI consortium - TradeLink, is planning to establish an EDI gateway between the business community and the Government. First set up in 1988 by the private sector, the Government is the largest shareholder, demonstrating clearly the colony's pursuit of EDI as a national objective.

Notwithstanding such governmental backing of TradeLink, the development and implementation of EDI in Hong Kong have been shaped largely by market forces. There are more than 100 companies using existing VAN services such as GEIS and IBM IN to send and receive structured business information to overseas trading partners, mainly in the area of procurement.
6.4 India

In India, a multi-governmental agency effort has been initiated to promote EDI. Two public sector VANs are in place and projects are ongoing for the development of a customs clearance system for air cargo at Delhi Airport.

Involvement of the private sector has been considered of great importance for EDI development. The Federation of Indian Export Organizations (FIEO) has been designated as the focal point for the promotion of EDI in the private sector.

6.5 Japan

In Japan today, EDI is predominantly exploited as a business objective, with more advanced developments witnessed in its banking industry. Major banks and leading companies now exchange currency exchange transfer and bank reports electronically.

On the national front, the Japanese Customs and Tariff Bureau has implemented NACCS (the Nippon Automated Cargo Clearance System) which automates customs clearance for both import and export.

EDI is currently being channelled to fuel inter-industry and international standardization to facilitate domestic and global trading. The Japan EDI Committee formed under the auspices of the Ministry of International Trade and Industry promotes the adoption of EDIFACT standards for trading with overseas partners, and organizes working groups to develop UN standard messages. Japan is also currently the rapporteur of the Asia EDIFACT Board.

To date, Japan has more than 800 VANs registered with an estimated 50,000 EDI users under industry-wide VANs, private VANs and Keiretsu VANs (VANs led by big companies).

6.6 Republic of Korea

The nationwide community EDI network in the Republic of Korea, KTNet, was initiated by the Korean Foreign Trade Association in April 1990. The network which supports all trading companies and trade-related organizations, is expected to handle virtually all aspects of the import/export business ranging from trade administration, foreign exchange transactions, customs clearance and duties to shipping and insurance.

With the liberalization of the domestic VAN market in the late half of the 1980s, VANs such as DACOM Network Service, Samsung Network Service, posDATA Network were set up to do business as third parties VANs. At the same time, private group VANs also began to transmit/exchange electronic messages through direct links with each other.

As the first case of EDI application, the Pohang Steel Company (POSCO) initiated STEELVAN in 1987. The network is a steel customer communication
system connecting POSCO with its buyers and dealers. The second application of EDI was in the motor industry. KIA motors, the second largest automaker in the Republic of Korea, launched MOTORVAN in June 1989 to connect them to their suppliers.

In addition to these EDI networks, five other networks are being implemented by DACOM on a national scale to promote interdepartmental information sharing. These include the Resident Information System, Land and House Information System, Customs Clearance Information System, Employment Information System and Vehicle Management Information System.

In April 1994, the Korea Logistics Network (KLNet) was established by the Korea Maritime & Port Administration to provide electronic port services to the shipping community.

At present, there are some 200 VANs registered in the Republic of Korea with an estimated 1,300 EDI users mainly in the international trade area.

In an effort to boost the use of EDI, the Government enacted “The Act on Promotion of Trading Business Automation” legitimizing the Korea EDIFACT Committee to standardize its EDI activities nationally.

6.7 Malaysia

Malaysia has initiated several studies to formulate a strategic and operational plan for implementing EDI to expedite cargo clearance and trade facilitation in the Klang Valley Region. The Electronic Data Interchange (M) Sdn Bhd (or in short EDIM) has been commissioned by the National Chamber of Commerce and Industry Malaysia to implement the Port Klang Community System (PKCS).

The Port Klang Community System was implemented in phases, beginning with the submission of customs import and export declaration forms involving Customs and the forwarding agents. An electronic payment system was implemented to support Customs duty payments electronically.

Other EDI systems in Malaysia include the Veterinary Community System, implemented by Value Added Data Services (VADS), which facilitates the electronic application of permits for the import/export of livestock or meat products, health certificates, halal certificates and payment; Medi*Link which connects players of the entire medical community electronically; Supply*Link which is an integrated EDI solution for buyers, suppliers and their trading partners; KWSP*Link which connects banks, employers and employees for Employees Provident Fund transfers.

Private sector EDI operators are also prevalent in Malaysia. These include VADS, a joint venture between Malaysian Telecom and IBM; GEIS represented by AIMS and INC.

6.8 The Philippines

Recognizing the importance of EDI, the Private Investment and Trade Opportunities of Philippines (PITO) has commissioned a major consultancy house
to conduct a framework plan study on the introduction and implementation of EDI in the Philippines.

In the meanwhile, EDINet Philippines Inc, a joint venture between Singapore Network Services Pte Ltd and Ayala Corporation, implemented GTEBNet - an electronic network for textile quota administration export documentation and import authorization.

The Philippines is also looking actively into creating the conducive legal framework in which EDI can be implemented. Several proposed bills defining policies and regulations related to EDI and VAN services are pending in Congress.

6.9 Singapore

EDI in Singapore takes a national perspective, with the Government as the prime mover in setting up a nationwide EDI network infrastructure. Singapore Network Services (SNS) was incorporated in 1988 to manage and operate the nationwide EDI network.

TradeNet - Singapore's first nationwide EDI network was successfully implemented in 1989. EDI has since been extended to medical, legal, distribution, manufacturing, construction, banking and education sectors. Like TradeNet, these have also been initiated as nationwide EDI projects directed at enhancing sectoral effectiveness and efficiency.

To date, there are more than 12,000 users using EDI services. To facilitate global trading, SNS is also linked or planning to link to international networks such as GEIS, FENICS, BT and SITA. As part of its enhancement strategy, TradeNet is also connected overseas to the United States Customs for the communication of textile visa information.

Apart from TradeNet, ACCESS, short for Advance Cargo Clearance for Courier and Express Shipment, allows courier and air express companies to relay manifest information to customs authorities electronically from their overseas origin even before the aircraft lands.

PortNet of the Port of Singapore Authority for the maritime community enables users to more effectively communicate with the port authorities.

Spectrum, operated by the Cargo Community Network (or CCN), enables air cargo agents, ground handling agents, consignees and shippers to exchange paperless cargo related information. Modelled as a cargo community system (or in short CCS), the system now allows users to place booking for cargo space with airlines and track the movement of their shipment from point to uplift to the final destination.

EDIFACT is adopted as the national message standards for EDI.

6.10 Taiwan Province of China

The Government spearheaded the application of EDI nationwide via its
sponsorship of TradeVan. Under TradeVAN, the Customs Air Cargo Clearance System was successfully implemented in November 1992. To date the system has some 350 users. TradeVan handles some 97 per cent of import air cargo declarations and 70 per cent of the export declarations. The Customs Sea Cargo System was also implemented in November 1994. Further enhancements include electronic duty payments, transmission of shipping order etc.

Other EDI initiatives are in the automobile industry with the Automobile EDI system enjoying a userbase of 137 market area users.

Since liberalization of the value added network market in July 1989, many private network operators, for example, TTN are offering VAN services in various business areas. This has encouraged major shipping firms, including Evergreen, the world’s largest container shipper to start planning an EDI service for the processing of trade documents.

6.11 Thailand

Officially endorsed by the National IT Committee (NITC), the Thailand EDI Council (TEDIC) has become a national focal point for EDI related activities.

Early 1994, Thailand commissioned a major consultancy house to conduct a study on EDI implementation strategies in the country. In line with the recommendations from the study, a national EDI network - TradeSiam - is being established. Thailand expects to launch its first nationwide EDI network for customs clearance.

In addition, the Ministry of Transport and Communications has established a National Committee on Multi-model Transport (MMTC) with the mission to promote multi-modal transportation using the EDI technology.

CHAPTER 7 CREATING THE ENVIRONMENT FOR EDI

7.1 Introduction

Although the technology of EDI itself is based on a very simple concept of linking computers for direct exchange of information between organizations, the challenge is to coordinate and synchronize the implementation across a large number of agencies. Just as it requires a critical mass in the number of telephones for voice communication to work effectively, EDI requires a critical mass of companies to commit to its use before the full impact of its benefits can be felt.

The right environment with certain prerequisites must be present for a successful EDI implementation. This chapter discusses the factors indicating a ripe environment for EDI.

7.2 Telecommunication infrastructure

As EDI runs on the backbone of computers which requires a good telecommunication highway to transmit the electronic signals, it is indeed
pertinent to first look at the availability and reliability of such facilities before one is able to determine the state of readiness of introducing EDI.

7.3 The critical mass

Since EDI involves the linking of computers for the direct exchange of information between organizations, the success of any implementation is much dependent on the initial mass of organizations committed to using it.

First in the list of factors indicating readiness of the industry is the participation from a critical mass of users/organizations who have enough business communication flowing among them in order for EDI to make a significant impact on the way business is conducted.

For example, Singapore has looked towards bridging the gap between the public and private sectors in the trade industry, hence the birth of TradeNet. The critical mass of trade declarations flowing between the freight forwarders, traders and the relevant government authorities made it easy for Singapore to realise the advantage of using EDI in its first year of implementation.

If there are too few transactions between business partners, then organizations may not want to make the necessary investment to use EDI as the returns will be negligible.

7.4 EDI vendor support

When implementing EDI projects at the state-level or on a national basis, it is none the less wiser to provide a continuous full vendor support for all EDI users in the country.

This means that there should be a reasonable selection of computer vendors to see to the customization of EDI packages to meet the specific needs of customers or industry groups. Off-the-shelf generic packages should also be made available at affordable prices to attract low volume users.

7.5 EDI standards

It is necessary for organizations embarking on EDI to adopt a common set of standards for communication. If this is not done, one of the major benefits of EDI will be eroded. It is, therefore, important that common standards be adopted not only within a particular industry, but also across different industry sectors, both locally and internationally. It is only with this in place that organizations are positioned to embark on electronic communication, both at home and overseas.

The prevalent world-wide EDI standard, UN/EDIFACT, is a deliberate attempt to serve as a guideline for EDI implementers. These guidelines cover the generic layout of an EDI data file, without compromising on the sort of information that should be stored inside each file. In this instance, organizations wanting to adopt EDI may look into using UN/EDIFACT as the
layout of their files, for example, purchase orders, delivery notes etc. In complying with its format, it ensures compatibility when communicating with other business partners as well.

7.6 Value added networks (VAN)

Because of the need to adopt certain standard formats, organizations are thus advised not to develop or implement their own private EDI networks. If organizations were to communicate via their private network, they would require multiple connections to different networks. This would discourage the establishment of additional connections beyond major business relationships, and limit the extent to which this technology could be applied because the cost of maintenance would be too high.

The use of EDI, therefore, presupposes that there is a third party VAN operator, offering open communication facilities through which organizations can connect electronically to all their business partners. The EDI network that offers a wide range of services should meet the common needs of most organizations as well as the specific needs of particular industry groups. For example, most VANs offer internetwork communications which enable organizations to communicate to their customers and suppliers linked to other networks. With these third-party VAN networks in place, an organization only needs to connect to the central network to communicate electronically with business partners.

The set-up time-frame, support structure of a VAN network and its expansion plans to cater to the growing need for new facilities will all point to a decision to use existing EDI networks as opposed to building individual ones.

CHAPTER 8 EDI IMPLEMENTATION

8.1 Introduction

Planning for its implementation is an important factor for success. With strategic planning on how EDI is to be applied, the resultant impact is likely to be much more significant than results achieved from pockets of implementation which are not properly planned and integrated into existing operations.

This chapter provides step-by-step guidelines to initiate EDI implementation, from reviewing the need for EDI to deciding on the technical solution to implementation issues.

8.2 Identify organizational needs for EDI

First, study the company's existing workflow and how it can be improved using EDI. Identify bottlenecks of current systems and explore how EDI can be used to dissipate the bottlenecks. This study should attempt to cover the whole range of data and information flow through the entire company and not be limited to known EDI applications.
As part of this exercise, one should also identify opportunities for streamlining current workflows across organizational boundaries in order to take full advantage of the introduction of EDI.

One example of such streamlining and re-engineering of current workflows is the quick response concept which is fast being adopted by the retail and manufacturing industries because of its wide-ranging impact on customer services and the companies’ bottom line. By fully integrating the collection of point-of-sale information and automation of reorders directly from the manufacturing plant based on customer buying patterns, systems across the distribution chain can be programmed to trigger off chain reactions from the manufacture of goods to delivery and sale at retail outlets, with minimum inventory in stock. This implies a change in the in-house systems of retailers and manufacturers to accommodate the new concept of procurement.

8.3 Weigh the cost and benefits of EDI

Having identified the areas in which EDI implementation can help to dissipate bottlenecks and improve workflow, one should then weigh the benefits of EDI against the costs of setting up the system.

The costs of EDI implementation go beyond start up costs of acquiring the EDI software and hardware components and training. Ongoing costs such as VAN usage charges, maintenance and support costs need also to be taken into account.

8.4 Identify EDI business partners

Next is the identification of the business partners with whom to implement EDI. The following factors should be considered:

(1) Which of the business partners have the highest volume of transactions?

(2) Which of these business partners have the right prerequisites for EDI?

(3) If they are overseas business partners, do they have the right environment for successful EDI?

(4) Do these partners enjoy a good business relationship with you?

(5) Are they going to be your long-term business partners, thus warranting the EDI implementation?

(6) Do they have the same ideals and goals towards EDI?

Upon identification of business partners, discussions with them about the possibility of establishing an EDI link to replace the current transmission medium then needs to be initiated.

8.5 Obtain top management approval
EDI implementation is a strategic business issue. EDI impacts the way business is conducted. A successful EDI system integrates all functional processes of the business across departmental boundaries.

It is therefore crucial that all parties involved in the EDI system be committed to its success. Obtaining top management approval of the EDI implementation ensures that the EDI implementation is a overall company objective. Top management will also have the authority to approve the necessary resources required for the implementation and can set directions for implementing EDI strategically across departments.

8.6 Form a EDI project team

As EDI is not merely a technical exercise of converting paper documents to electronic messages, EDI implementation involves not only personnel with the necessary technical expertise, but also those who are experts in their areas of business. An EDI project team needs to be formed to ensure that the requirements of all parties are addressed, and to ensure that the implementation is well managed and on schedule.

The EDI project team can be headed either by an in-house expert (with IT and EDI experience) or by external consultants. The project team will coordinate overall project activities, ensure project scope is adhered to, plan the implementation and monitor its progress as well as resolve issues with users and vendors.

8.7 Education and training

Prior to the implementation of EDI, education and training programmes should be put in place as a vehicle to communicate corporate attitudes about EDI. The training and education programme can also be used as a power tool to demonstrate senior management support of EDI. These programmes prepare people for the changes that are forthcoming.

An EDI training programme prior to EDI implementation could cover basic concepts of EDI and the benefits EDI can bring about. The training programme should also address concerns which staff may have in EDI implementation, such as redundancy of employees. This serves to allay any fears or apprehension of staff in embracing the technology and harnesses commitment to the eventual EDI implementation.

An EDI training programme nearer to the date of implementation could cover specific areas of user operation, the EDI environment as well as how to use the system.

A third category of training programme can be developed specifically in the technical areas to prepare the technical staff for the maintenance and support of the system.

8.8 Decide on EDI standards

It is necessary for organizations embarking on EDI to adopt a common set of standards for communication. If this is not done, one of the major
benefits of going EDI will be eroded.

Hence, the set of EDI standards to be adopted in your EDI implementation need also to be agreed upon by you and your business partners. UN/EDIFACT is the prevalent global EDI standard used in most countries today.

8.9 Decide on the connection options

The various possibilities of running your own EDI system should be investigated. Are you building your own proprietary network or selecting a third party VAN? If you are making use of a third party VAN, which one? Factors determining how to select a VAN which will meet your needs is discussed in chapter 5.

8.10 Implementation planning

With your business partners and VANs identified, and the EDI application prioritized, implementation planning comes next. An implementation schedule is to be drawn up so that all parties are aware of all actions required and the time-frame allocated to each task in order for the EDI implementation to be realised. At this stage, you should also decide whether or not to plan a pilot implementation and which approach should be taken towards full implementation.

8.11 Conclusion

In conclusion, a successful EDI implementation requires not only good strategic planning, but a will to change and a determination to succeed in concert with all the parties in your company as well as your trading partners.
# ANNEX I

## ASEB MEMBER COUNTRIES/ECONOMY CONTACT POINTS

<table>
<thead>
<tr>
<th>Country/Contact</th>
<th>Address</th>
<th>Contact number/E-Mail</th>
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<tbody>
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PART 2 UNIFORM RULES OF CONDUCT FOR INTERCHANGE OF TRADE DATA
BY TELETRANSMISSION (UNCID)

CHAPTER 1 - INTRODUCTORY NOTE

I The international trade transaction

The UNCID rules are meant to provide a background for users of EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport) and other systems of Electronic Trade Data Interchange, hereafter for short EDI.

Users will have detailed knowledge of the cumbersome procedures involved in an international trade transaction, and the decisive advantages of electronic interchange. For illustration please see figure 1 which shows data flows and message functions.

II The computer age - towards paperless trading

It is widely expected that the impact of computerization will be as great as that of the industrial revolution. Computers are already providing all sorts of services at rising speed and diminishing cost. International trade data communication, however, seems to be a missing link. Yet the need is great. Not only do paper documentation and procedures represent as much as 10 per cent of goods value; they are slow, insecure, complicated and growing. The possibilities of cost reduction are in the order of 50 per cent to the benefit of not only the main parties, but everyone involved, not least the authorities.

This is why a major activity of the Working Party on Facilitation of International Trade Procedures of the United Nations Economic Commission for Europe (ECE), over the last decade and a half has been the creation of the tools that would make electronic interchange of data in international trade a secure, effective and cheap alternative.

EDI is the direct transfer of structured business data between computers
by electronic means, i.e. the paperless transfer of business "documentation". (An illustration of this development is given in figure 2.)

The past years have seen an explosion of interest in EDI between national and international trade participants. The technology is available and the momentum is growing. It is estimated that within five years EDI will be commonplace between majors in international trade transactions.

But EDI cannot operate to any great extent without a common international standard, and progress has been made in drawing together different standards. Three building blocks are required: common data elements equivalent to the vocabulary; a syntax, which equates to the grammar in a normal language; and standard messages which combine data elements and syntax into a structured business message similar in concept to the paper document. These instruments are being created in the work coordinated by the ECE.

Alongside these technical developments thought and attention has also been given to what may be described as the "legal" aspects of EDI.

III The legal background

Because of its physical characteristics, the traditional paper document is accepted as evidence. It is durable, and changes or additions will normally be clearly visible. The electronic document is quite different. It takes the form of a magnetic medium whose data content can be changed at any time. Changes or additions will not appear as such.

The paper and the data communication links are only media for carrying information, however, and it is possible to establish techniques which give electronic data interchange characteristics that make it equal or superior to paper not only as carrier of information, but also as regards the evidential functions.

First EDI in itself presupposes procedures that make this form of communication more secure. In addition to identification this technique can also provide for error detection and correction. Authentication in the sense that the data content is correct can also be established, and privacy can be secured by several means built into the system. Finally, authentication, in the sense that the correct authorized person has issued the message, can also be secured.

That is why the ECE, the United Nations Commission on International Trade Law (UNCITRAL) and the Customs Co-operation Council (CCC) have recommended to governments and organizations responsible for determining documentary requirements, that they undertake an update and overhaul of these requirements to allow for EDI. This will, however, take time. It is also dependent upon a general acceptance of a high level of security in data interchange.

That is why it has been felt desirable to develop a set of internationally accepted rules - UNCID. The first draft was based on the idea of creating a standard for communication agreements. It was found, however, that due to the differing requirements of various user groups this was impracticable. There was on the other hand general agreement on proposals for uniform rules as a code of conduct.
The International Chamber of Commerce (ICC) agreed to establish a Joint Special Committee with participation from other interested organizations and user groups to evaluate and formulate such a set of rules. UNCITRAL, ECE, CCC, the UNCTAD Special Programme on Trade Facilitation (FALPRO), the Organization for Economic Co-operation and Development (OECD), the International Organization for Standardization (ISO), the Commission of the European Communities, the European Insurance Committee and the Organization for Data Exchange by Teletransmission in Europe (ODETTE) were all represented in this committee in addition to various commissions of the ICC.

In developing the rules the Committee based its work on certain vital concepts, _inter alia_, that:

(a) Aim at facilitating the use of EDI through the establishment of an agreed code of conduct between parties engaged in such electronic interchange;
(b) Apply only to the interchange of data and not to the substance of trade data messages transmitted;
(c) Incorporate the use of ISO and other internationally accepted standards to avoid confusion;
(d) Deal with questions of security, verification and confirmation, authentication of the communicating parties, logging and storage of data;
(e) Establish a focal point for interpretation that might enhance a harmonized international understanding and therefore use of the code.

Acknowledgement and confirmation illustrate some of the problems found in developing useful rules. In some systems acknowledgement is a mandatory requirement. In others it is taken as good conduct. In others again the sender has to ask for it. UNCID opts for this last solution. In certain cases the sender will also want to know that the content of the transfer has been received in apparent good order and has been understood. The sender may then ask for confirmation. This of course touches on the material content—but only marginally. It should not be confused with the concept of legal acceptance—that is another (third) layer which is wholly outside the UNCID rules.

It was also foreseen that the rules could form part of or be referred to, in any Trade Data Interchange Application Protocol (TDI-AP) or other specific communication agreement.

**V Need for specific communication agreements**

User groups may be organized in several ways. But they all need some form of communication agreement, although requirements differ according to the groups in question and to what has been included in their "users manual" or "application level protocol" which is an agreement, but of a more technical nature.
Applying the strong need for communication agreements where EDI is used between defined organizations. It is suggested that this need may be even more important in direct open communication.

Several user groups have stressed that the UNCID rules make a useful basis for their communication agreements. UNCID, agreed rules of conduct, give more than a mere starting point. Defining an accepted level of professional behaviour, they also secure a common approach.

The details and form of communication agreements differ according to the size and type of the user groups. The agreement may be included in a protocol or form a separate document. It may contain additional rules, for example, bearing on the substantive elements of the data exchanged, on the underlying agreement and on the professional approach. It is therefore not practical to formulate a standard model.

It may be useful, however, to outline certain elements that should be considered in addition to UNCID, when formulating an agreement:

1. There is always a risk that something may go wrong - who should carry that risk? Should each party carry its own or would it seem possible to link risk to insurance or to the network operator?
2. If damage is caused by a party failing to observe the rules, what should be the consequences? This is partly a question of limitation of liability. It also has a bearing on the situation of third parties.
3. Should the rules on risk and liability be covered by rules on insurance?
4. Should there be rules on timing, for example, the time within which the receivers should process the data, etc?
5. Should there be rules on secrecy or other rules regarding the substance of the data exchanged?
6. Should there be rules of a professional nature - such as the banking rules contained in SWIFT?
7. Should there be rules on encryption or other security measures?
8. Should there be rules on "signature"?
   It would also seem important to have rules on applicable law and dispute resolution.
CHAPTER 2 - TEXT OF THE UNIFORM RULES OF CONDUCT

Article 1: Objective

These rules aim at facilitating the interchange of trade data effected by teletransmission, through the establishment of agreed rules of conduct between parties engaged in such transmission. Except as otherwise provided in these rules, they do not apply to the substance of trade data transfers.

Article 2: Definitions

For the purposes of these rules the following expressions used therein shall have the meaning set out below:

a) Trade transaction: A specific contract for the purchase and sale or supply of goods and/or services and/or other performances between the parties concerned, identified as the transaction to which a trade data message refers;

b) Trade data message: Trade data exchanged between parties concerned with the conclusion or performance of a trade transaction;

c) Trade data transfer (hereinafter referred to as "transfer"): One or more trade data messages sent together as one unit of dispatch which includes heading and terminating data;

d) Trade data interchange application protocol (TDI -AP): An accepted method for interchange of trade data messages, based on international standards for the presentation and structuring of trade data transfers conveyed by teletransmission.

e) Trade data log: A collection of trade data transfers that provides a complete historical record of trade data interchanged.

Article 3: Application

These rules are intended to apply to trade data interchange between parties using a TDI -AP. They may also, as appropriate, be applied when other methods of trade data interchange by teletransmission are used.

Article 4: Interchange standards

The trade data elements, message structure and similar rules and communication standards used in the interchange should be those specified in the TDI -AP concerned.

Article 5: Care
a) Parties applying a TDI-AP should ensure that their transfers are correct and complete in form, and secure, according to the TDI-AP concerned and should take care to ensure their capability to receive such transfers.

b) Intermediaries in transfers should be instructed to ensure that there is no unauthorised change in transfers required to be retransmitted and that the data content of such transfers is not disclosed to any unauthorised person.

Article 6: Messages and transfers

a) A trade data message may relate to one or more trade transactions and should contain the appropriate identifier for each transaction and means of verifying that the message is complete and correct according to the TDI-AP concerned.

b) A transfer should identify the sender and the recipient; it should include means of verifying, either through the technique used in the transfer itself or by some other manner provided by the TDI-AP concerned, the formal completeness and authenticity of the transfer.

Article 7: Acknowledgement of a transfer

a) The sender of a transfer may stipulate that the recipient should acknowledge receipt thereof. Acknowledgement may be made through the teletransmission technique used or by other means provided through the TDI-AP concerned. A recipient is not authorized to act on such transfer until he has complied with the request of the sender.

b) If the sender has not received the stipulated acknowledgement within a reasonable or stipulated time, he should take action to obtain it. If, despite such action, an acknowledgement is not received within a further period of reasonable time, the sender should advise the recipient accordingly by using the same means as in the first transfer or other means if necessary and, if he does so, he is authorized to assume that the original transfer has not been received.

c) If a transfer received appears not to be in good order, correct and complete in form, the recipient should inform the sender thereof as soon as possible.

d) If the recipient of a transfer understands that it is not intended for him, he should take reasonable action as soon as possible to inform the sender and should delete the information contained in such transfer from his system, apart from the trade data log.
Article 8: Confirmation of content

a) The sender of a transfer may request the recipient to advise him whether the content of one or more identified messages in the transfer appears to be correct in substance, without prejudice to any subsequent consideration or action that the content may warrant. A recipient is not authorized to act on such transfer until he has complied with the request of the sender.

b) If the sender has not received the requested advice within a reasonable time, he should take action to obtain it. If, despite such action, an advice is not received within a further period of reasonable time, the sender should advise the recipient accordingly and, if he does so, he is authorized to assume that the transfer has not been accepted as correct in substance.

Article 9: Protection of trade data

a) The parties may agree to apply special protection, where permissible, by encryption or by other means, to some or all data exchanged between them.

b) The recipient of a transfer so protected should assure that at least the same level of protection is applied for any further transfer.

Article 10: Storage of data

a) Each party should ensure that a complete trade data log is maintained of all transfers as they were sent and received, without any modification.

b) Such trade data log may be maintained on computer media provided that, if so required, the data can be retrieved and presented in readable form.

c) The trade data log referred to in paragraph (a) of this Article should be stored unchanged either for the period of time required by national law in the country of the party maintaining such trade data log or for such longer period as may be agreed between the parties or, in the absence of any requirement of national law or agreement between the parties, for three years.

d) Each party shall be responsible for making such arrangements as may be necessary for the data referred to in paragraph (b) of this Article to be prepared as a correct record of the transfers as sent and received by that party in accordance with paragraph (a) of his Article.

e) Each party must see to it that the person responsible for the data processing system of the party concerned, or such third party as may be agreed by the parties or required by law, shall,
where so required, certify that the trade data log and any reproduction made from it is correct.

**Article 11: Interpretation**

Queries regarding the correct meaning of the rules should be referred to the International Chamber of Commerce, Paris.

*Note: The official ICC Brochure containing the text of the UNCID may be obtained from the ICC Secretariat, 38 Cours Albert Ier, F75008 PARIS.*

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