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## Electronic data interchange : its benefits in trade activities for developing countries

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**WORLD MARITIME UNIVERSITY**

Malmö, Sweden

**Electronic Data Interchange;  
Its benefits in trade activities for developing countries**

By

**LUIS E. NOVA**  
Dominican Republic

A technical paper submitted to the World Maritime  
University in partial fulfillment of the requirements for  
the award of

**POSTGRADUATE DIPLOMA**

in

**SHIPPING MANAGEMENT**

1999

## DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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**DEDICATION**

**TO  
MY BELOVED PARENTS,  
MY BROTHERS, MY SISTER,  
MY NIECE AND NEPHEW**

## **ACKNOWLEDGEMENT**

My utmost appreciation goes to **GOD** for his spiritual support in the past twenty-two months of my studies at the WMU.

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My thanks also go to my colleagues for the time shared together, especially to Alfredo Parroquin for his advice and presence when anything went wrong.

## **ABSTRACTS**

Title of Dissertation: **EDI; its benefits in trade activities for developing countries.**

Degree: **Technical Paper**

This dissertation is a study of the benefits that EDI can bring to developing countries where the delay and cost of documentation are the big obstacle for the efficiency of trade.

A brief look is taken at the concept of EDI, definition, key elements and different methods of communication.

In additional, issues relating to legal aspect of EDI are studied. In particular focuses have been made in writing issue, signature issues, and requirements for original and for documents, etc.

Moreover, this study deals with the main problems in developing countries, such as: Customs formalities, lack of good system of communication, problems face for shipping companies, cost of documentation.

Furthermore, the reader will have the opportunity to get an idea how some developed countries are working nowadays with the EDI and the advantages got for using it.

Finally, the concluding chapters give the summary of this study and recommendation for the implementation of EDI in developing countries.

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## LIST OF ABBREVIATIONS

ANSI ASC	American National Standard Institute Accredited Standard Committee.
BHT	Bremen Harbour Telematics.
CCC	Customs Co-operation Council.
CCCITT	the Consultive Committee for International Telegraph and Telephone
DBF	Data Base File.
EDI	Electronic Data Interchange.
ESCAP	Economic and Social Commission for Asia and The Pacific.
EMAIL	Electronic Mail.
GTDI	Guidelines for Trade Date Interchange.
ISO	International Standard Organisation.
OSI	Open System Interconnection.
SNA	System Network Architecture.
SITPRO	Simplification of International Trade Procedures Board.
UN	United Nations.
UNCTAD	United Nations Conference on Trade and Development.
UNCITRAL	United Nations Commission on International Trade Law.
UNDP	United Nations Development Program.
UN/ECE	United Nations Economic Commission for Europe
UN/EDIFACT	United Nations Electronic Data Interchange For Administration Commerce and Transport.
VAN	Value Added Network.

## CHAPTER ONE

### Introduction

Trade and commerce have benefit from information Technology (IT) for decades through automated data processing, remote data access and on-line transactions.

The easy access to information, the quality of the information and speedy methods of exchange is essential elements of the economic success.

Over the past ten years many parties involved in the movement of goods for international trade have identified and qualified significant benefits to be gained by introducing Electronic Data Interchange (EDI) and thereby handling less paper documents.

However the adoption of EDI and other Electronic Commerce techniques has been very slow in this vital business area. Developed countries always have been placed in the better position of the world market than developing countries that the EDI system is still an enigma.

In developing countries the lack of acknowledge, lack of money, no interest to invest in EDI system, fear to the change, etc. all these thing and more have brought as consequence the problems that people involves in trade have to facing such as:

- Loss of time in ports and Customs when the goods arrives to these countries.
- Have to dealing with many different papers.
- Lost of money and.
- Corruption.

The implementation of EDI brings benefits both domestically and internationally. Use of EDI makes immediate and long-time benefits including:

- Is the fastest, most efficient way to exchange purchasing orders, invoices, fund transfer, shipping notices and other frequently used business documents.
- EDI is a tool to save money and time.
- Eliminate data entry errors
- Lower office overhead.
- Reduce paper consumption.
- Increase revenue by expanding the geographic market.
- Reduce cost by reducing or eliminating paper based documents and associated preparation, storage and retrieval cost.
- Advance shipping notice can be sent to the receiver to say what is arriving. This is ideal for manufacturers who use a Just in Time system.
- A more efficient use of staff resources.
- The ability to track vessels and cargo.
- Enforce discipline within the business operation.

The aim of this research is to analyse the current situation that is facing the developing countries due to the lack of using EDI system and the benefits that they can get with it.

The author does not pretend to giving specific case of one country, this paper will study the general overview of the developing countries's problems that in my own point of view are very similar in most of these countries

The document begins with the general definition of EDI and the different methods of EDI communication.

Chapter 3 looks into the legal aspect of EDI.

Chapter 4 analyses the main problems that developing countries are facing at

this time and the specific areas where these problems take place.

Chapter 5 will give an idea on how some developed countries that have adopted EDI are working these moments and the benefits achieved.

Finally, chapter 6 summarises and concludes the research and recommendation of this study.

Library documents, personal interviews and observation formed the major source data of this document.

## CHAPTER TWO

### WHAT EDI IS

#### 2.1 Definition of EDI

Electronic Data Interchange (EDI) is defined by UNCTAD (ESCAP/UNDP Manual, 1993, page 3) as:

“Computer-to-computer transfer of commercial and administrative transaction using an agreed standard to structure the data pertaining to that transaction”.

The term “Electronic Data Interchange” is normally only used to signify communication of business transactions between computers in different companies in a standard format. Thus, information sent by e-mail does not strictly come under the definition of EDI.

E-mail is not standard format and is not sent automatically, rather it is sent whenever the user decides to send it.

EDI messages were originally sent directly between the computers: the sending computer modem dials the receiving computer, a telephone link is established and the message is sent. EDI messages are now often sent by the internet: the cost is lower (there is no need to pay for transatlantic telephone calls). Further, since virtually all companies now have some form of Internet access already, the system is easier to implement.

#### 2.2 Key Elements of an EDI System (ESCAP/UNDP Manual, 1993, page 3)

The key elements of an EDI System to be set up are:

1. Hardware (computers);
2. Telecommunication network; and

### 3. Communication software and translation software.

#### **1. Hardware**

Hardware is the technical term for all types of computers and the related physical equipment. Computers are key elements in establishing EDI communications as they provide the physical interface, which enables and facilitates the electronic transmission of message between two or more trading partners. An EDI system can be established using any combination of mainframe and/or personal computers.

#### **2. Telecommunication Networks**

Telecommunication facilities consist of telephone lines, which provide the medium over which information can be electronically transmitted between sending and receiving computers. The connection may also be made via satellite.

In case where a telecommunication line cannot be to the receiving computer, the information can be written to a floppy disk or a magnetic tape. The floppy disk or magnetic tape can then be physically transported to be used the receiving computer.

#### **3. Communications Software and Translation Software.**

Communications software enables messages to be transmitted and received between computers. For one computer to “talk” to another computer, they must have communications software and translation software.

Translation software enables messages to be en-coded and de-coded into a format which both computers can understand. Software at the transmitting computer, “translates” the message into the required format or sequence of data elements as demanded by the message standard. At the receiving computer, the software

translates the standard message into a format, which can be understood by the receiving computer and printed or displayed in plain language.

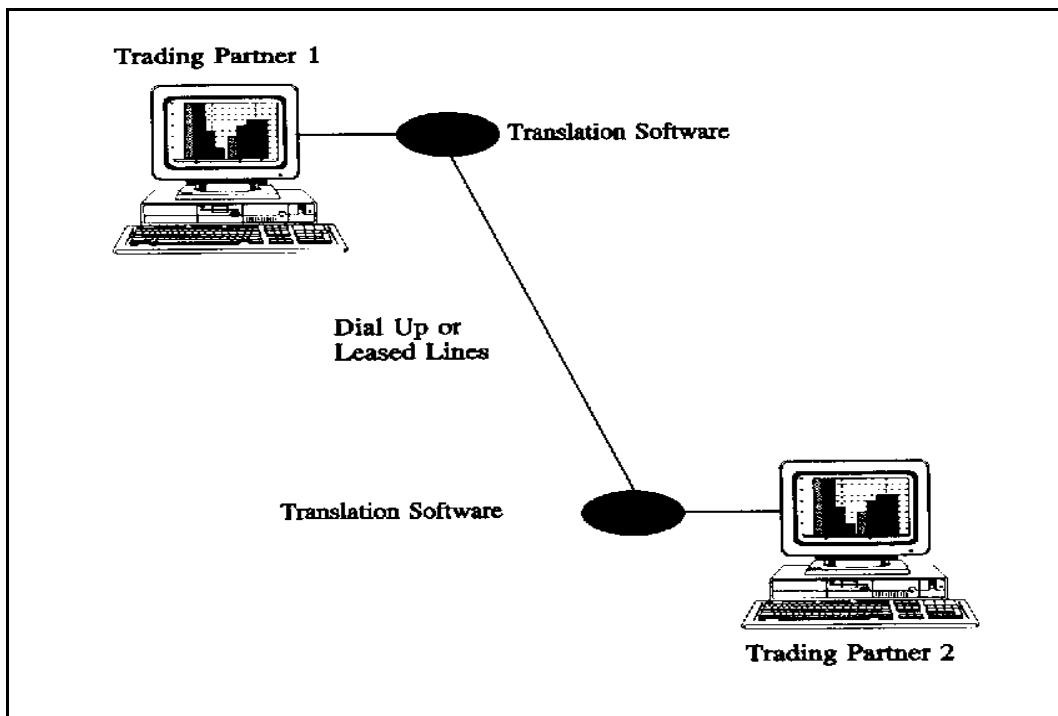
### 2.3 Methods of EDI Communication (ESCAP/UNDP Manual, 1993, page 4)

There are two main methods of computer-to-computer transactions using EDI technology:

#### 2.3.1 Direct Method

With this method, it is possible to send information from computer directly to another computer via a telecommunication line.

The telecommunication line can be leased (dedicated) line or a public switched telephone line (dial-up). With this method, the direct links between computers are limited by the capacity of the telecommunications network.



Figure, 1. Source: ESCAP/UNDP Manual, 1993



### **2.3.2 Indirect Method**

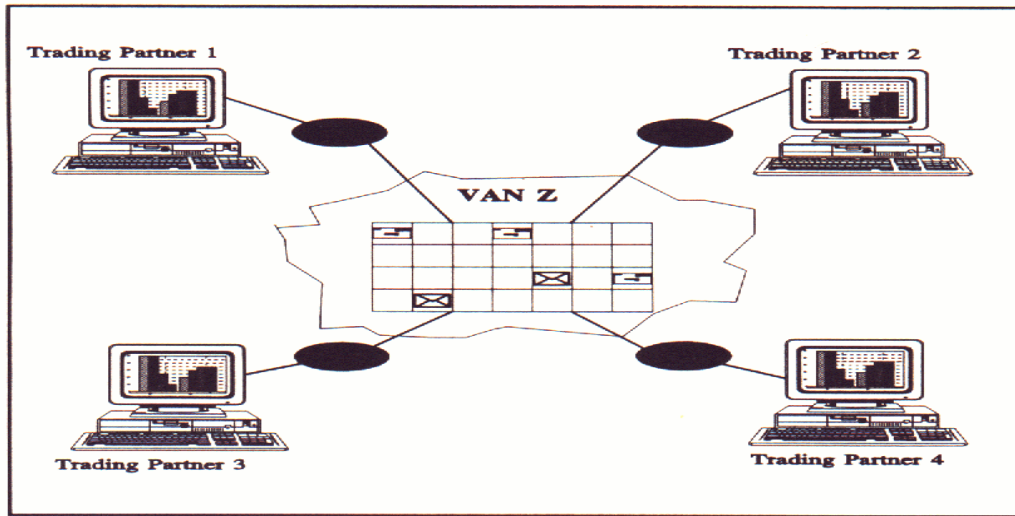
The indirect method involves the passing of electronic messages between computers using a third party by way of a “Value-Added Network” (VAN). The use of a value-added network makes it possible for any number of computers to link up.

“VAN” is the term used to describe a system whereby telecommunication lines are linked to an electronic mailbox facility for the transmission and storage of messages between trading partners.

An electronic mailbox facility may be compared with posting a letter. Instead of placing a hard copy letter in a post office mailbox, an electronic “letter” is posted to an electronic mailbox in the value-added network computer, which receives stores and passes the electronic message to the receiver on request.

An electronic mailbox can also be used in conjunction with a traditional database facility. A database facility is an information bank, (i.e. it stores information and permits retrieval by authorised users only). A database can be situated within personal computers of trading partners or within a mainframe computer. The combination of an electronic mailbox and database facility enables messages received via the mailbox system to be processed and updated in the receiver’s database.

j



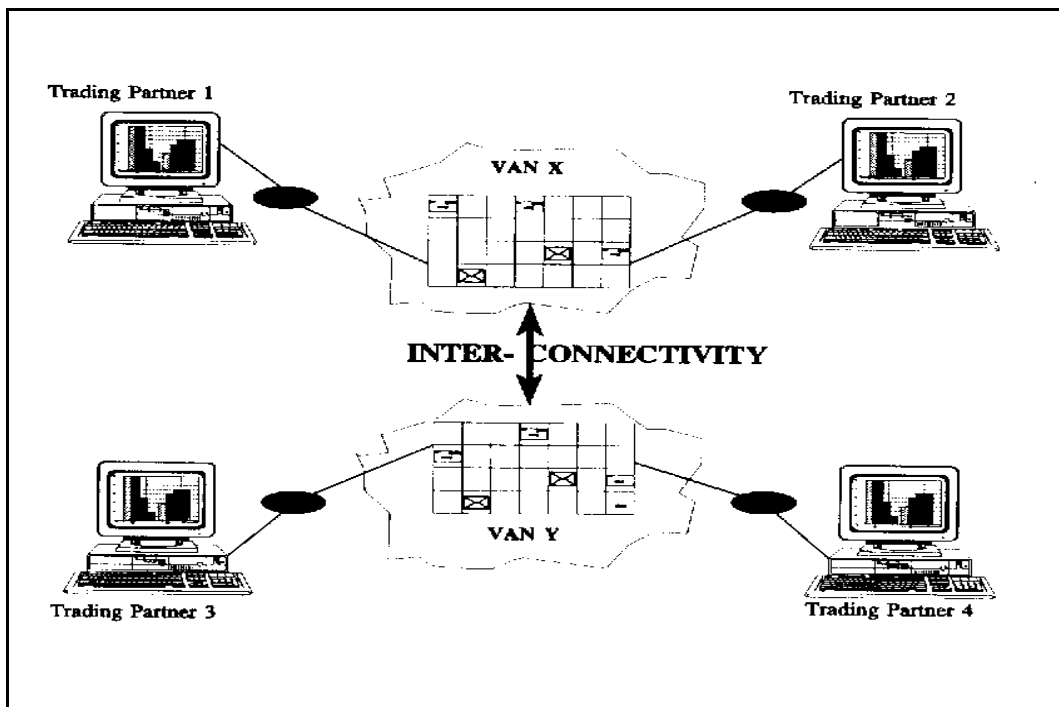
Figure, 2 Source: ESCAP/UNDP Manual, 1993.

### 2.3.3 Inter-connectivity

Trading partners on a particular value-added network who wish to communicate with other trading partners belonging to another value-added network, have two options either to;

- Subscribe to the value-added network of the other trading partner and pass message via that network; or
- Convince the two value-added network providers to connect with each other so those messages can pass between one value-added network and the other.

The interconnection of two (or more) different value-added networks requires both a physical connection between the networks and software which translates messages into a format for transmission and recival that can be understood by both agents. The process of connecting two networks is known as “inter-connectivity”.



Figure, 3 Source: ESCAP/UNDP Manual, 1993

## 2.4 Communication Protocols and Standards

There are numerous standards or set of rules which define the way in which information is transmitted from one computer across a circuit to another computer. These standards are particularly important when communication has to take place over incompatible computer and telecommunication.

### 2.4.1 Communication Protocols.

Are standards, which enable a system, operating under one communications protocol to interconnect, through a conversion process, with a system operating under a different protocol; thus providing the interface between terminals and telecommunication networks. A protocol comprises of:

- **syntax:** commands and response;

- **semantics:** the structured set of request and actions permissible by each user, and
- **Timing:** type of events and sequence.

Following the standardisation of the various protocols, two major types are currently used:

- Open System Interconnection (OSI) a general purpose standard leading to application to application communication through seven layers of the OSI model. Developed by the International Standards Organisation (ISO), to which all national and other standards setting bodies defer. The Consultative committee for International Telegraph and Telephone (CCITT) which operates within the broader standard issue set out by ISO, has developed X. series recommendations: a family of standards for interfacing terminals to networks. The X. series represents a major step in the evolution from the long standing.
- System Networks Architecture (SNA) an IBM proprietary communications protocol which does not as yet conform to ISO standards.

As a result of the standardisation of protocols, particularly the development of OSI protocol, global interconnection of networks has been made easier.

#### **2.4.2 Message Standards.**

Is a set of rule, which facilitate the electronic interchange of trade and business data. They relate to the form and content of the message/data. A “Standard Message” is a set of data elements reflecting conventional business transactions in electronic formats according to an approved standard.

The application of EDI in its early days was characterised by the use of various message standards: However, the subsequent rationalisation of the numerous message standards led to the dominance two:

- UN/ECE GTDI - developed under the auspices of the United Nations Economic Commission for Europe (ECE). Guidelines for trade Date Interchange for use in Europe.
- ANSI ASC X12 - developed under the auspices of the American National Standards Institute Accredited Standards Committee X12 for use in North America.

Commencing in 1986, the best features of UN/ECE GTDI and ASC X12 were combined under the auspices of the Economic Commission for Europe (ECE) with the intention of developing a common global standard. This standard is called UN/EDIFACT, which stands for Electronic Data Interchange for Administration Commerce and Transport. UN/EDIFACT standard messages are base on UN/EDIFACT rule which govern the way different types of data segments can be used to construct UN/EDIFACT standard messages.

UN/EDIFACT messages have three Status levels.

- Status 0- message is in its developmental stage.
- Status 1- message is introduced in specified areas as a trial (to test the message in real situations).
- Status 2- message has been successfully tested and is available for full implementations.

## **CHAPTER THREE**

### **LEGAL ASPECT RELATED TO EDI (ESCAP/UNDP Manual, pages 11-15)**

In the course of an international trade transaction, a large number of parties have to produce, check, transfer, receive, process and file hundreds of information elements relating to the goods, their transport and payment. For many years the transfer of information has been carried through paper-based documents.

Paper-based document, such as Bills of Lading, have placed the test of time due to their:

- durability
- portability
- ability to be read in ordinary language
- ability to be authenticated by visible signature and
- ability to provide a permanent record.

Is important to mention that paper documents used in business trading have provide the means for the “transfer of rights”, to be evidence in tangible form. Moreover, they have lent themselves readily to assignment and negotiation by endorsement or delivery.

On the other hand, paper-based communication have many disadvantages, they are error prone, costly and slow to transmit. When the case is about document of title,

the situation about time delay can occur because of the need to proof of the contract in order to secure the payment and delivery.

Consequently of these disadvantages, paper-based methods in these days are being increasingly replaced with the more efficient transfer of information through computers and electronic technologies. The replacement of paper with the electronic technology has and will bring about radical changes in the way international trade is carried out, specially the way in which a commercial contract is made. This raise serious legal question regarding business transactions conducted electronically; thus requiring a re-examination of traditional contract laws.

The legal issues arising from use of EDI within the transport and trade facilitation areas are complex and quite different from other industry sectors. For example in the financial sector, data transmission is normally carried out between members of reasonably homogenous groups, which have relatively standardised operating procedures. However, the transport environment is characterised by very diffused groups of participants encompassing organisation which differ widely in function, technical expertise and, sometime operational languages. Furthermore, there are national legislative rules and varying international transport conventions, which often require “written documents”.

There are also problems arising in relation to conflicts of law between countries and in the choice of law, which is to govern any international trading transaction. It has been estimated that the laws of at least 160 sovereign states have to be considered.

The main issues that have been identified and are currently under review are:

- Transaction and system rules;

- requirement for written;
- requirement for a document;
- information for a signature;
- requirement of an original;
- formation of a contract and choice of law;
- agreement with third party network provider; and
- accounting and auditing.

With the potential rapid growth of EDI in coming years, it has become particularly urgent that these issues are addressed.

### **3.1 Transaction and System Rules**

Transaction rules relate directly to business transactions and are concerned with the substantive legal effect of the contract. System rules are the rules relating to the mode and format of messages to be communicated and their conformity with the specifications and requirements of the system. System rules can affect the outcome of the transaction in two ways:

- Information communicated through an EDI system may be legal but ineffective if the contractual purpose is not achieved because of failure to conform to the system rules.
- Successful transmission through an EDI system may not necessarily result in a contractually effective communication unless the appropriate legal rules and laws have been observed.

These two concepts must compliment each other for a workable EDI system to exist.



### **3.2 Requirement for Writing**

Most national laws and international conventions include provisions requiring certain transactions to be concluded or evidenced in writing or certain information to be presented in writing. A writing may be required for variety reasons. If it is required as a condition of validity of the contract, failure to comply with the requirement would render the transaction null and void. If, on the other hand, a writing will not generally affect the validity of the contract but its enforceability in the event of litigation.

In the absence of a legislative framework, trading parties to address question of validity and enforceability of contracts formed through the use of EDI instead of traditional written documents uses interchange agreements.

### **3.3 Requirement for Signature**

Signature of other forms of authentication is normally required to establish the identity of the signatory and his intention to associate himself with, or be bound by, the contents of the document. The most common form of authentication required by law is manual signature. The more recent national laws or international conventions, however, permit the required signature to be made by other forms of authentication, such as stamp, perforation of facsimile, or by electronic means. The Hamburg Rules, for example, provides that “the signature on the bill of lading may be in handwriting, printed in facsimile, perforated, stamped, in symbols, or made by any other mechanical or electronic means, if not inconsistent with the law of the country where the bill of lading is issued”.

Investigation carried out by a number of organisations, such as the ECE, UNCITRAL and the commission of the European Communities, have identified the legal requirement for a signature on documents used in international trade as a major obstacle to the growth of electronic commerce.

### **3.4 Requirement for Document**

In addition to the legislative provision requirement “writing” there are many statutes and conventions which, although not specifically referring to writing, require transfer of a document.

Traditionally, legislation has called for documentary evidence in the context of public administration such as Customs, tax and other regulatory authorities. However, more recently, Customs and other revenue authorities in many countries are accepting electronic presentation of documents. Recently working parties involving Customs and other related authorities have been investigating the legal implications of document transfer through electronic means.

### **3.5 Information Permanency**

The requirements for storage of certain documents or information in paper form for accounting, tax, audit, evidence and other legal of administrative purpose constitute barriers to the development of electronic trading. The UNCITRAL Model Law provides legislative guidance for removing such barriers by ensuring that the keeping of electronic records is given the same status as the keeping of paper records.

The question of information “permanency” in electronic communication is therefore of great concern as the possibility that individuals with a superior knowledge of computers can manipulate EDI system and commit fraud. The possibility of fraud has been highlighted through cases of bank fraud individuals know as “computer hackers” gaining access to high security computers.

An important legal consideration is that companies must be aware of improvements in security to avoid potential liability for breach of security occurring as a result of using an outdated system.

### **3.6 Requirement for an Original**

The requirement that certain information or documents be presented in an original form is regarded as creating an obstacle to the development of electronic commerce. Indeed, since the concepts of “writing”, “signature” and “original” are closely interlinked, the requirement is often for a written, signed, original paper document. An original may be required in order to ensure the integrity of a document and that the information presented in a document has not been altered. In the context of documents of title and negotiable documents, such as bills of lading, where rights are attached to the physical possession of the document, it is essential to ensure the original document is in the hands of the person claiming the title to the goods represented therein.

In an electronic environment the distinction between an original and a copy is an artificial one. “if a message is transmitted from one computer to another, the bit string which might be called the original, and the one which is the copy cannot be distinguished.” What is essential in an electronic context is that a data message, which has been created by a particular person, has not been altered; in other words, it is essential to establish the integrity and authenticity of the data message. Various techniques are now available (such as digital signature technique) to confirm the integrity and authenticity of a data message.

Implementation of EDI will see the further demise of the requirement for an original document in the shipping and transport industries. The use of unique non-transferable password and codes will offer greater security than presently exists

with the use of “original” documents. Some model interchange agreements specifically address the issue of originality of data messages. For example, under the ABA Model Agreement any document properly transmitted pursuant to the Agreement “when containing, or to which there is affixed a signature (signed document) shall be deemed for all purposes (a) to have been signed and (b) to constitute an ‘original’ when printed from electronic files or records established and maintained in the normal course of business.

### **3.7 Validity and Formation of contracts**

As a general rule, in most jurisdictions, a contract is formed when the parties reach an agreement on its terms, unless specific formalities such as document or signature are required by law. Thus, a contract concluded orally is valid in most legal system. It follows, therefore, that a contract concluded by an electronic means of communication should, in principle, be valid.

However, a number of question and uncertainties arise in the context of the use of electronic communication techniques for concluding a contract. Question arise as the validity of such contracts, especially where there are legal requirements for writing, signature, etc., the time and place of formation of such contracts, the proof of the terms of the contract in case of dispute, and so on. The time when the contract is formed is important in determining the passing of property and transfer of risk of loss or damage in case of sale of goods. The place where the contract is concluded may determine which national law is to govern the contract in the absence of an effective choice of legal provision as well as the establishing jurisdiction in case of litigation.

### **3.8 Agreement with Third Party Network Providers**

In addition to the legal relationship between the sender and receiver of data, there are also needs to be a well established legal relationship between the trading party and the network provider and the suppliers of hardware/software. If errors arise due to failure in the system hardware/software, then adequate contractual provision need to have been put in place identifying where the liability lies.

Currently, the law is unclear as to the liability of network suppliers and hardware/software suppliers to third parties who suffer loss when the system does not work. It is important therefore that the appropriate legal relationships and responsibilities are clearly set out in any contract of supply. This issue also has ramifications in of any insurance cover.

### **3.9 Accounting and Auditing**

Apart from the legal issues discussed, accounting and auditing for EDI may have legal ramifications, particularly in the area of fraud and control of data transmission. The increased speed of processing orders means that controls will need to operate far more quickly to detect and correct errors before they affect production and delivery. There will be less paper to examine with EDI and auditors may have to fundamentally change their approach to evaluating data integrity.

Other question such as the period for which electronic records should be kept, who should keep them and whether all data should be retained in electronic form or only printouts also need to be resolved. These problems are of practical concern and have legal ramifications. At the introduction of EDI, close liaison should be

established between the industry and the accountancy profession in order to avoid difficulties at a later stage.

It is apparent from the preceding discussion that many of the legal issues relating to the use of EDI are not as yet resolved. Nevertheless, some reforms have been made and guidelines are being drawn up to provide a legal framework for electronic transactions.

## **CHAPTER FOUR**

### **MAIN PROBLEMS**

#### **4.1 Problems in Developing Countries**

Technology is a productive asset with commercial value. Technology are incorporated, contained or related to variety of other item, as suitable combination of which is required for production of goods, services and technology itself. Technological capacities and technological transaction involve stocks and flow including (I) intangible assets such as design and engineering plans, models, systems analyses, feasibility reports, product or process patents, etc. (ii) Tangible assets such as capital goods, equipment, pilot plant, etc. (iii) human assets such as skill and know-how at all levels of a technical, managerial or organisational nature. (UNCTAD, (1988). Technology Policies for Development, page. 19).

The economic history of nations has shown that technology is determinant factor in the process of development and an important variable influencing the patterns of trade and financial flows among countries.

As we all know developing countries are facing several numbers of problems such as:

- Inadequate information on technology sourcing.
- Lack of experience or Scarcities.

- Lack of a good network communication system.
- Lack of money to invest in computerisation.
- Bureaucracy in the government system.

In developing countries it is usual to see that the people involved in exports and imports of goods lose time and money in port due to the customs formalities. The bureaucracy plays an important role, a lot of people involved in a simple task that can be avoided with the implementation of the EDI system. Not only the time lost is the problem, the corruption within these countries is one of the main problems (money under the table) to move a document and continue the normal course.

The lack of know-how or experience in developing countries is another issue; sometimes they have to resort to the use of expatriates. People do not know what is the new tendency in the trade world, they stay as mummies for a long period of time. This problem can be seen as lack of training received and the lack of investment in human resources.

The most resistant problem, however, is probably the isolation of individual systems imposed in many countries, by inadequate, inefficient and sometimes madly perverse telephone and general communication services. Telephone connections across frontiers are often impossible, from one city to another, within national boundaries, extremely difficult and, even within a single city, exceptionally time-consuming.

All sorts of devices, including walkie talkie radio, are being used to facilitate person to person contacts within limited areas, but these provide no solution to the need for computer to communicate freely, if not with other systems, at least with single systems, from different locations.



Think about to have already implemented the EDI system within such countries that until now their simple communication by telephones are difficult, is not a reliable dream.

As a example businesses in Coastal West Africa are handicapped by extremely difficult and expensive telecommunication: the cost of international telephone calls there can be up to 500% higher than in developed countries. The number of telephones per 100 inhabitants can be as low as 0.1. Access to international electronic networks such as internet is severely limited. Facilities like full IP internet connection, Value Added Networks (van) nodes (e.g. AT&T), or packet switching data networks (PDSNs) are for the most part non-existing in these countries. This lack of easy and affordable access to electronic networks is a huge barrier for enterprises that need quick and accurate information on markets and trade opportunities.

As consequences traders in Coastal West Africa are often isolated from the world trading community. They lack to relevant information as well as contacts with traders in other part of the world. A more effective dissemination of trade-related information throughout Coastal West African countries is needed. (Source: <http://www.edi.co-uk.com>)

The lack of money for investment in computerisation scarce. The majorities of developing countries are facing an economic crisis; they do not give importance to technology in some cases. They try to invest the money in other sector that is priority for them. Everyday the devaluation of their currency compare with the hard currency (dollar) is very high, this make more difficult to get dollars and buy outside computers for the implementation of the system.

Is very important to mention that some governments in developing economies are concerning and now appreciate the extra administrative control obtainable through

computerisation. Often such systems are the only means of obtain reasonably up-to-date and accurate information about national economic performance and fiscal balance. They are concerning that there is not way to scape at the new tendency and the only way to survive for the time being and for the new millennium is being on board of the high technology to provide high service and can compete in the global market.

Industries and countries not equipped with an EDI capacity will find themselves at a serious competitive disadvantage. Acquiring and using EDI will become without doubt a critical trade issue for developing countries in the next few years.

Fortunately the continuous reductions in the cost of computer hardware is putting computerisation and EDI within the grasp of the most Customs services. What will be necessary however will be a generous response by the richer countries to the education and training needs of developing countries in the new techniques.

#### **4.2 Obstacles for the Shipping Companies**

When the goods are carried by sea they are accompanied by a number of documents, such as the bill of lading, a letter of credit, an invoice and an insurance policy. Each document may be issue with a number of copies. Several parties to these documents, e.g. carriers, freight forwarders, bankers, insurers, etc., may be involved in their preparation and the cost of documentation may reach 6% or 7% of the value of the cargo.

In additional to the cost, the master cannot deliver the cargo at the port of destination without the production of the bill of lading. In the eye of the law, the holder of the bill of lading is regarded as the owner of the cargo to whom it must be delivered against the presentation of the bill of lading. Failure to produce the bill

of lading will result in delay, as the master will insist on having a bank guarantee for the value of the cargo.

The use of computers was then thought to be the way to save the cost of documentation. Computers were, and still are, used to produce paper documents which are exchanged between the parties in the traditional way. Obviously, very little could be gained from using such a method, apart from storing the data contained in the documents.

As we know many shipping companies established in developing countries are facing serious problems due to the lack of new techniques and in some cases the network communication system that are already established.

For example in the Dominican Republic EDI standard is not used for transmitting electronically the manifest to the customs authorities. The system is sponsored by the UNDP (United Nations Development Program). This system is in some part a little bit rustic, the DGA fixed the parameter to all shipping companies to submit by diskette or by email every information about the manifest through DBF (Database File). This brings as consequences that many shipping companies cannot develop a system that can be more beneficial for them.

When these companies establish their offices in these countries shock with the reality that they can not work in sophisticated environment that can do their activities more pleasant.

Another issue is that many shipping companies have been working very much in isolation. Individual companies or close groups have worked hard and diligently to produce EDI solutions to their own particular problems but such initiatives have suffered from being inward-looking, small-scale and unorchestrated.

But one thing, which unites everybody involved with EDI in shipping, is the conviction that the key to a global solution lies in the development of universal standards. Without standards, efforts to come to grips with EDI are little more than sporadic guerrilla encounters. With standards, a co-ordinated plan of battle can be drawn up.

Shipping companies in some developing countries have to work with the traditional equipment as usual, e.g. fax, telephone and some cases where the telecommunication is a little bit high they can use emails.

The idea to save time, save cost, paperless, give better services to the clients, faster communications, enforced discipline within the business operation, etc., is a dream in some of these countries and sometime they can convert in a nightmare.

#### **4.3 Customs in Developing Countries**

Customs is more and more viewing itself as providing a service to those involved in international trade and to the economy in general. The traditional Customs responsibilities concerned with protecting the revenue still remain very much with us. This is particularly true in developing countries where Customs duties form a large proportion of the national revenue. Increasingly, however, the trend is toward the simplification of Customs formalities in order to facilitate trade and stimulate economic development of the Customs Co-operation Council (CCC) i.e. the promotion of the harmonisation and simplification of Customs procedures.

Most Customs authorities recognise the economic advantages to be gained from trade facilitation; raw material, machinery and parts, can reach manufacturers more quickly; finished product can be cleared for export more quickly; the whole process of foreign trade can be done more cost-effectively and practically speaking, port can speed up throughput and improve operation.

Customs procedures and documentation in developing countries are extremely unmanageable. Simplify these procedures and Harmonise Customs documentation is necessary.

These Kinds of problems were solved in developed countries by the ratification and implementation of the Customs convention both on bilateral and multilateral basis. Convention such as:

- **The Convention on the Facilitation of Maritime Travel and Transport.** The purpose of this convention was to simplify and minimise the documentary requirement associated with the customs, immigration and other documentary requirements for ships arriving or leaving ports.
- **International Convention on the Simplification and Harmonisation of Customs Procedures. (Kyoto Convention, 1973).** The Kyoto Convention was drafted in response to demands by the European countries for a systematic approach to Customs procedures and documentation. This demand was a result of the complex Customs procedures delaying the movement of goods due to divergences in national Customs procedures and documentation of import/export. The simplification of Customs procedures often leads to a reduction in the number of documents required by Customs, thus further reducing the costs of importing and exporting. Simpler formalities and procedure are also less costly to the Customs since they are easier to administer. With many formalities and complicated procedures, effective delegation of power is more difficult because there are frequently problems, which require decision at head office level. The resultant frequent consultation between official and offices causes uneconomic use of the resources available. Simpler procedures facilitate the training of officials, and are more easily adapted for the use of office machines. (UNCTAD, (1995). Multimodal Transport Handbook, page. 83).

Fear to change is another problem in the Customs area. The facilitation effort is sometime frustrated by resistance to change, by fear of job losses resulting from rationalisation, or by vested interest.

Customs are often seen as a major obstacle to the free flow of goods in trade and sometime are seen as enemy of the taxpayer. And it is sometimes true that their intervention at ports and at border crossings causes serious delay, with amongst traders, ranging from fury to resignation. More of the problems that the Customs in developing countries are facing are due to the lack of visibility of what is coming across the frontier.

Automation provide the answer to many of the problem which Customs are facing. Time-consuming, labour intensive, clerical task can be considerably reduce; staff can be release to perform vital cargo examination and control functions; Customs law can be uniformly and vigorously applied and suspect consignments can be targeted for closer scrutiny. The overall effect of this is that low risk cargo (the vast majority) can be cleared more thoroughly. But customs automation cannot take place in isolation; it must be linked to the other international trade chain.

Customs and Importer/exporter have two vital interests in common. First, they both want to control goods from the time they are landed from the vessel until the time they leave the port and secondly, they want this to happen as quickly and efficiently as possible.

To meet these requirements computerised cargo control and clearance systems are emerging at a growing number of ports. This is a development which the Custom Co-operation Council (CCC) whole heartedly welcomes. The electronic interchange of data between Customs' computer systems and the computer systems of other members of the port community can bring about many advantages both for

customs and for us. Consignments can be controlled efficiently and effectively; paperwork can be reduced dramatically; increased traffic volumes can be handled within existing staffing levels; consignments can be cleared more quickly and a high level of efficiency and service can be provided.

EDI opens up many possibilities, “pre-Arrival release processing” by Customs would enable the bulk of cargo to be cleared immediately upon arrival without further Customs intervention. EDI would speed up this communication of Data and could also facilitate the introduction of “release on minimal information” systems. Under such system, only that data required by Customs to enable them to make a release decision need be transmitted. The remaining information required for accounting and statistical purpose being transmitted later.

As everybody knows, Customs are a critical participant in all international trade transactions. Consignments traded internationally must be processed by at least two Customs authorities—once at export and again at import. If Customs do not embrace EDI technology on a large scale then the advantages for the other participants in trade are going to be largely offset. It is for this reason that the Customs Co-operation Council (CCC) has in the past, and will continue to advocate very strongly the use of EDI techniques by the member administration.

Standard data elements, standard code sets, standard message syntax (EDIFACT) have all been developed by the UN/ECE in Geneva. These EDIFACT standards have full backing of the Customs Co-operation Council (CCC) and have been formally recommended to members.

Traditionally, the movement of goods in international trade is accompanied by a parallel flow of information between the parties involved: exporter, importer, Customs agents, banks, carriers, forwarders, insurers. The information has been carried on paper documents, costly to prepare, check, forward and file and

dependent on mail services for transmission. International trade operators have often to complain about the slow procedures and the cost of this paperwork.

The solution is to replace paper as a data carrier, by using teletransmission. New technology made available by telecommunication services allows everyone to communicate instantaneously from one end of the world to other. This enable computer to be linked up and to automatically transmits the trade data required.

This Standard should not only be used in your contacts with Customs but in other contacts: between you and ports, between ports, with bankers, importers and exporters. Indeed, it was designed with that end in view and at the CCC are in no doubt that its widespread use will be highly beneficial in the context of EDI.

Customs in developing countries have to move very fast to the new age because of one of the main responsibility is to provide an efficient service in support of national economic activity.



## **CHAPTER FIVE**

### **EDI IN SOME DEVELOPED COUNTRIES**

When traders in the developed countries enter into the international business transactions, the scenery shown is very comfortable, it takes less time, saves cost, etc. On the other hand, the situations in developing countries are totally different. Delay in whole sense of the word, not cost efficiency, etc.

This chapter shows how some developed countries have developed a workable EDI system in international trade.

#### **5.1 System used by US Customs.**

Automated Manifest System: This is a cargo inventory control and release notification system for sea, air and rail carriers, under the US Customs. The aim is to speed the flow of cargo and entry processing, providing participants with electronic authorisation prior to arrival.

It Covers air, sea, rail carriers, port authorities, service center, truck carriers (as secondary parties), forwarders, freight station, terminal operators. Sea AMS is available to carriers, secondary notify parties. Manifest data can be transmitted electronically for all cargo to the US prior to vessel arrival. Customs can review the manifest data and determine whether the merchandise needs further examination or whether to release it on arrival.

Upon receiving release from Customs, it can make decisions on staging cargo, the importer can do the arrange for examination, release and further distribution, all before the image arrives.

Around 75 per cent of in-bound ocean bills are transmitted electronically to custom. (Source: Jeffery, K; (Nov. 1998) “IT in Ports. Opportunities in Information Technology”).

In my personal experience I could see how fast the US customs can receive the import manifest through Sea-Land system in the Dominican Republic to US customs in USA. This process has two main tasks:

- Send the bill of lading to the revenue system of the company.
- Transmit the manifest to the Customs authorities.

Before transmit the manifest to the Customs, first, the data has to pass through an internal filter to check any inaccuracy in it.

## **5.2 System operated by Port of Bremen/Bremenhaven**

The Port of Bremen/Bremenhaven forms the second largest port group of the Federal Republic of Germany. Each year, 8,300 ships call at the harbour installations in both cities and more than 400 shipping lines are regularly served.

Teleport Bremen of the dbh (Datenbank Bremische Häfen) operates as intelligent node within a world wide data and information network. It offers forms and advantages of electronic data interchange in combination with clearing capacities, and indeed world wide, with any desired partners.

The System uses the UN/EDIFACT message standard format recommended by UNCTAD, Customs Co-operation Council, ECE among others.

Most important advantages of Bremen Harbour Telematics (BHT) are:

- Increased productivity and quality
- lower cost
- faster processing of orders
- reduction of errors
- more event-controlled status monitoring
- faster customs clearance
- shorter waiting times for rail and trucks
- better data protection.

(Source: information offered by dbh by email, 1999).

\*For more details see appendix I\*

### **5.3 System operated in Gothenburg, Sweden.**

Transport Data Link was established in 1990, to satisfy the documentation need of the Swedish customs, ports, the shipping community, banks, insurance companies, importers and exporters among other agencies involved in the documentation of international trade. The system was established in Gothenburg, Sweden (the biggest port in Sweden), to reduce the time and cost of documentation of international trade as well as the administrative cost of carrying out documentation in international trade.

The system is used by importers and exporters among other users, to communicate with the Swedish Customs, the Port of Gothenburg, banks, shipping lines, forwarders, insurance companies, trucking companies, railway authorities, financing, insurance, booking of cargo, etc., to carry out their day to day imports and exports transaction.

The system as the same of the others uses the UN/EDIFACT standard format transmission of data in international trade, to effectively communicate with other system globally. (Source: Susanne Hansson. Port of Gothenburg. Personal email). \*For more details see appendix II\*

#### **5.4 System operate by Port of Rotterdam**

INTIS (International Transport Information System) is the EDI system used by the Port of Rotterdam. Was established to reduce time and cost of monitoring, booking and documentation of international trade through the Port of Rotterdam, the system link the individual electronic messages operated by the Port of Rotterdam, the Dutch Customs, Shipping companies, freight forwarders, banks, insurance companies, carriers, shippers among others to facilitate the movements of transit cargo or goods imported for home use.

The use of this system has reduce the cost and time spent on the documentation of imports/exports in the Netherlands, has reduced the time spent in clearing goods by the Dutch Customs, the Ports of Rotterdam, shipping companies among others. It has also enable the banks, insurance companies, shippers and consignees to monitor the movement of their investment in the international trade, by giving them on-line information on the actual happenings in the trade as it relates to their functions and responsibilities. \*For more details see appendix III\*

#### **5.5 Why EDI for Developing Countries**

The competence in trade is very wild; in other word, the bigger traders will eat the little one. Traders have to be aware what are going up and how the market is moving at this time.

The use of information for take decision, and which use new technology to access, process and dealing with this information will give the tools to get a position and survive in the competitive world market.

The use of telephone lines in developing countries are very expensive, in this matter with electronic communication, traders in these countries will save time and money with EDI.

End Repetition is placed in practice. For example: if one trader in the Caribbean area is trading with other in somewhere of Europe and the trader in the first place need a copy of the document, instead of calling, he simply checks his mailbox. This result in great time saving again from not having to copy and fax/mail copies of business documents.

As was mentioned in the first chapter about some advantages from EDI, such as: will increase the revenue of one organisation by expanding its geographic market, etc., but the most important is that EDI perseve existing revenue by forming stronger relationship with existing customers.

## **CHAPTER SIX**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **6.1 Conclusions**

A simple definition of EDI: direct computer to computer transfer of business information. This world EDI spread around the countries, but only some of them have caught the real meaning and benefits that it can give at the moment and for the future.

In these countries where EDI have been developed with good step, several factors have made this possible, i.e.: introduction of international message standard, development of good telecommunication network system, the advantages that can offers to the users such as tangible advantages: save time and money, fast and efficient, eliminate errors, reduce paper consumption, facilitate Just in time process and the intangible benefits also include saving resulting from increased accuracy. With EDI, there is no need to re-enter information, thereby reducing the possibility and costs of errors.

It is important to mention that the full benefits of EDI are only gained when the majorities or all of the active parties are linked into the system with the effort of adoption of UN/EDIFACT standards and optimise EDI system. It looks like that in the long run a global EDI system will be available everywhere.

As was mentioned in chapter four some difficulties can frustrate or delay the implementation of EDI system in developing countries.

- Lack of experience and know-how about EDI system, how does EDI work.
- Lack of money to invest in computerisation.
- Lack of good technological platform, in some cases obsolete, in others insufficient and precarious, but sometimes both of them together at the same time. Platform is the hardware and the system itself.
- Lack of an efficient network communication system that is one of the most important key factor for the implementation of EDI

It is important to observe that one of the principal obstacles of the success of the actual EDI is the lack of adequate planning and proper implementation of the system, rather than for technical reason.

Much of these countries do not have National EDI Council and Steering Committee. For that reason an appropriate framework is necessary in order to assist in the co-ordination of the initial development and implementation of EDI. Such framework may be embodied in the establishment of a National EDI Council.

Legal issue, operational issue, auditing issue and organisational issue have to be in mind when EDI system is required to be implemented. It is well known that governments in different countries have been working a lot legislating and establishing a favourable framework that would eliminate any distrust, which might exist to the use of electronic means of communication in international trade. Developing countries and least developed countries have to have in mind that an agreeable legal framework and institutional environment for electronic commerce will be necessary to achieving the objectives, which EDI was created.

If the traders do not have trust and confidence with the use of electronic communication in trade the full develop of EDI never will be possible to be established, in this matter people involves have an important role to make it a reality

Not everything is colour of rose. There are different disadvantages depending on the type of network. Closed network can provide business with better relationship with a few current supplier or customer to increase speed of response to ordering goods. There are fewer problems of bottleneck and congestion where the network gets overloaded with electronic traffics.

Another issue is changing standards. Each year, most standards bodies publish revisions to the standards. This poses a problem to EDI users. Maybe one trader may be using one version of the standard while other trading partners are still using older versions.

EDI is too expensive. Some traders are only doing business with others using EDI. If a person want to trades with them, they have to implement an EDI program. This expense may be very costly for small traders.

Traders in developed countries and developing countries have to keep in mind that EDI opens the door to increased business. More and more companies are mandating EDI capabilities. In some case there are companies will not do business with others companies unless they are EDI ready, although; this can not be consider as a full advantages because of the result of this is a limited groups of people can do business with.

## **6.2 Recommendations**

To establish and implement EDI system in any country and be sure that the system will be successful, these recommendations have to be followed:



- EDI has to be seen as a management commitment. EDI is a business strategy not a technology and must have management direction.
- Establish a National EDI council and Steering committee. This two organisms can be composed by various Ministers of the government and private sector, such as:

Ministry of Finance (Customs)

Ministry of Trade

Ministry of Transport

Ministry of Communication

National Shipowner Associate

National Road Transport Associate

National Freight Forwarder Associate

Port Authority

Rail Authority

National Chamber of Commerce

- .Social and Culture attitude should be considered when EDI takes place. Resistance to the change will appear due to EDI impact to the traditional roles and practices of the trading communities.
- Educate potential users and trading partners. This should be an on-going process and started as soon as possible after those likely to be affected have been identified. Note that education is significant factor in reducing resistance to implementing EDI.

- Look for assistance to these countries where EDI has been well implemented and successfully introduced. This is a good method to gain knowledge to join one group that has developed standards.
- The allocation of funding should be considered vital. These funds can be used to acquire program system and to training and educate people.
- Finally, EDI can not operate successfully in a close environment, particularly in the global context of the international trade and transport. To make easier the communication between trading partners and transport sector is necessary to adopt and implement global message standard, such as UN/EDIFACT. This standard has resulted in internationally agreed message formats.

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## APENDIX 1

teleport bremen



page 3 - 10/07/99

### We connect systems - the Bremen Harbour Telematics (BHT)

With the development of the Bremen Harbour Telematics (BHT) the dbh has again proved its know-how by the realisation of overlapping telematic projects.

As EDI platform for the DP systems of the transport industry, (forwarding agents, logisticers, shipowners/agents, terminal operators), railways and authorities the BHT ensures smooth organisation in the ports of Bremen/Bremerhaven and beyond. The networking of the most differing DP systems of the transport industry and authorities and their rational and actual communication over only one intersection are its outstanding features. Each participant can transmit and receive electronically and directly further process independently from hardware and software structured data.

The advantage is obvious: In the seaport advance loading information permits larger

disposition latitudes and more rational work flow, which, above all, means a quicker re-shipment. And the carrier profits in addition from the exact consignment and statement follow-up.

The BHT comprises in detail:

1. Ship's data store (export/import)
2. Deliver/supply/set down/pick up conventional loads and containers
3. Pack/unpack containers
4. Release
5. Customs and export control
6. Condition and complaint reports
7. Dangerous goods notification port authorities (Export/import/transit)
8. Electronic customs clearance (import)
9. B/L data transmission on EDIFACT basis

#### Software Development

During the development of efficient and modern software tasks thorough thought and experience are demanded. The dbh advice and support offers both in the project management, the system analysis and the utilisation development.

You will receive no „ready-made goods“, but made to measure and commercial solutions which take into consideration present standards but, at the same time, meet individual demands.

Anyone wanting to undertake information processing needs the correct software. After thorough analysis the dbh supplemented and optimised present solutions or developed new part applications or client-related application modules for Client-server systems, the PCs

and networks. Long years experience in the sphere of the transport industrie have made dbh into a sought after software developer and hardware partner.

Rapid adaptation to the constantly changing industrial issues demands clearly arranged, user-friendly and easily modifiable software. The development on modern systems with engineer-type procedures and modern tools is obvious. The applications are based on standardised and reuseable components as part of an optimal system architecture. The system environment consists of C, C++, Visual Basic and Cobol; based on INFORMIX, Oracle, ACCESS and SQL-Server with TCP/IP nets and UNIX, WINDOWS 95 or WINDOWS NT.

**COMPASS 2000**

Since 1978 the *COMPASS* system of the dbh is in operation in the Bremen ports. It has proved itself, with its most varied functions, by the seaport forwarding agents.

Not only for technical reasons, but also for economic ones, this complex HOST application is nowadays superseded.

The dbh offers the seaport forwarding agents with **COMPASS 2000** software which will meet with their requirements. It is built up on modular form, so that the forwarding agent can assemble his appropriate packet individually.

It is based on a TCP/IP network with central databank server with decentral PCs

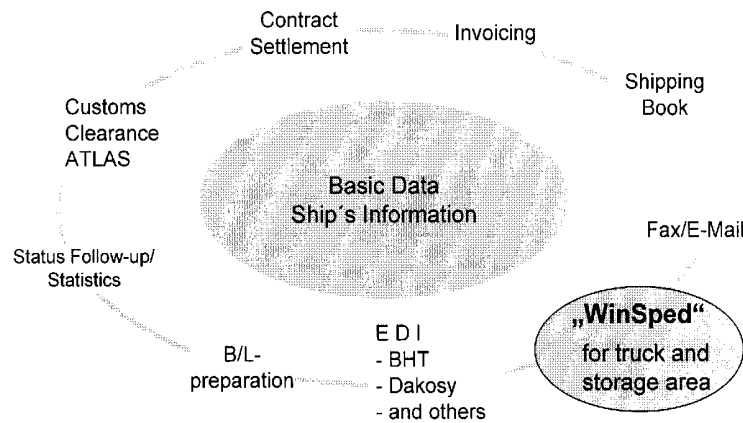
or as one-place-version.

The Clients are provided with windows 95 or windows NT. On the databank server windows NT runs with the databank Microsoft SQL server or Microsoft ACCESS.

Alternatively also a UNIX platform can be set in as databank server with the databanks INFORMIX or ORACLE. The ODBC interface will be employed.

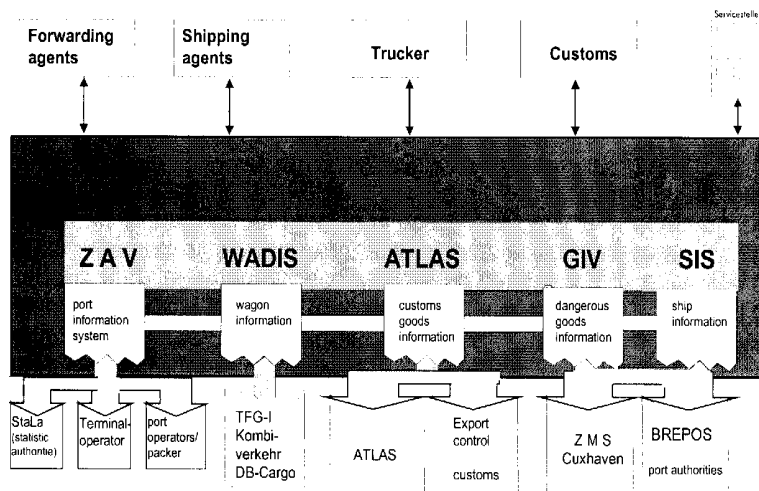
The realisation of the application took place with Visual Basic V5.0.

Multiuser operation and control of access rights and the compatibility with other Microsoft products is guaranteed.





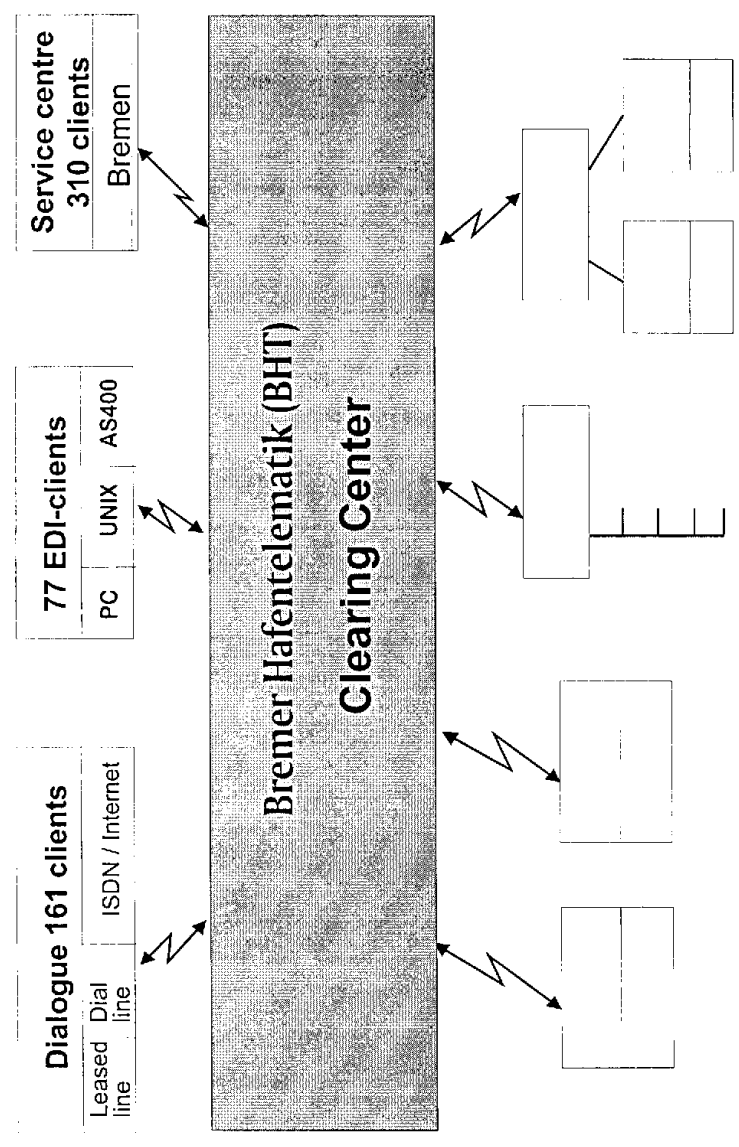
**Bremen Harbour Telematics (BHT)**



**The Bremen Harbour Telematics (BHT) in the port group Bremen/Bremerhaven**

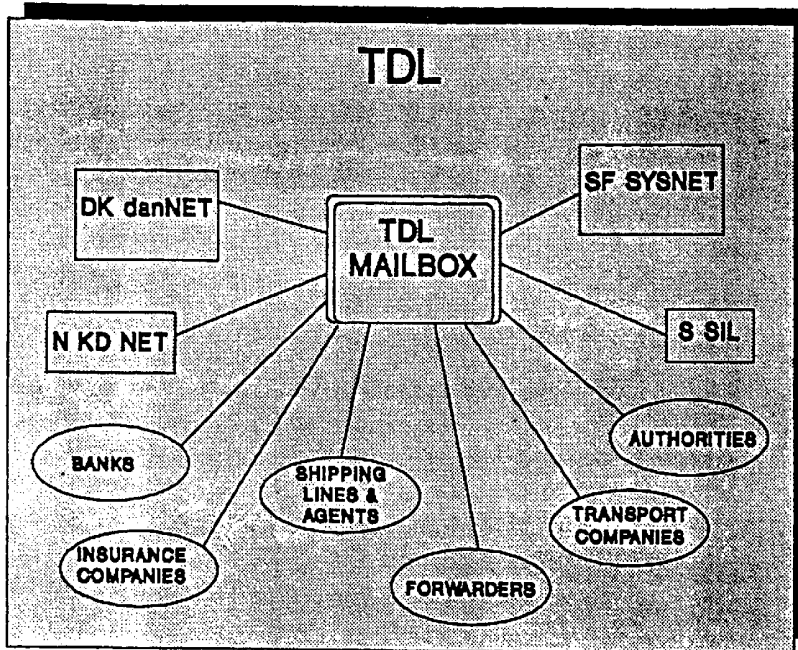
ZAV	Central contract follow-up for port contracts	GIV	Dangerous goods information seal
WADIS	Wagon disposition and information system - SEE to client contracting - ÖSHB Local system port railway Bremen	BREPOS	Bremen port operations system of the port authorities for traffic control, port fees and dangerous goods monitoring.
ATLAS	Automated Customs charge system and local customs settlement system	SIS	Ship's information system.

238 (548) companies



## APENDIX 2

Transport Data Link (TDL, Gothenburg)



- SYSTEM:** TDL is an EDI system incorporating a mailbox function. It is designed to provide large organizations with the ability to exchanging data with their trading partners.
- ESTABLISHED:** As of mid 1990 TDL will be incorporated into the Swedish Telecom Administration.
- COST OF DEVELOPMENT:** The initial funds for the development of TDL were provided by the Gothenburg Port Authority AB and Swedish Telecom.
- FEATURES:** TDL provides a mailbox function. It manages the information flow noting details of message senders and receivers, network providers, message type and times of transmissions. The system maintains a central database concerning details of users and information security procedures for individual users.
- TDL uses an open data communication system e.g. ODETTE File Transfer Protocol plus X.25.

A Help Desk is provided. Availability of the system is expected to be more than 98 percent.

TDL provides facilities for the introduction of new members and the testing of new messages. Consultancy regarding EDI policies and methods are available. Courses and seminars on EDI are organized.

TDL provides an EDI service to large trading and administrative organizations such as Customs.

By incorporating all participants in the trading chain, TDL has enabled a greater facilitation of trade through the Port of Gothenburg.

**MESSAGE  
STANDARDS:**

EDIFACT

**COSTS TO USER:**

TDL charges are a commercial matter as agreed between the main parties and their trading partners.

In the case of Swedish Customs the service is free for all participating companies if the "basic service" is used.

**USERS:**

The service is set up in conjunction with the Swedish Customs and will be used by all exporters and importers in their communication with Customs.

The Swedish Customs plans that the top 150 industrial companies and transportation companies will connect to the system in 3 to 5 years.

Smaller companies will also be invited to connect to the system.

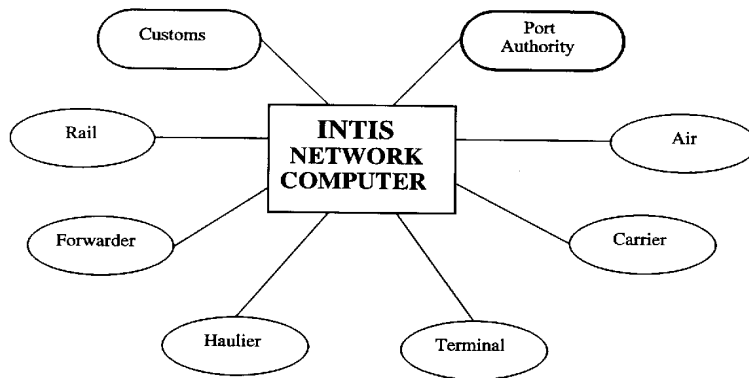
**FUTURE PLANS:**

The TDL service will be offered to the market as part of the service from the Swedish Telecom.

## APENDIX 3

### 5.7 INTIS, ROTTERDAM, THE NETHERLANDS

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<b>System</b>	<p>INTIS (International Transport Information System) is an organization which provides electronic services (EDI) to meet the requirements of the trading and transport industry.</p> <p>It uses the communication network facilities of PTT Telecom Netherlands for the electronic transmission of messages.</p> <p>The network facilities are adapted for overseas communication by the X.400 communications.</p>
<b>Established</b>	<p>INTIS was established in 1985.</p> <p>The initiators of INTIS were a number of Rotterdam based port and transport companies, namely:</p> <ul style="list-style-type: none"><li>• The Port of Rotterdam;</li><li>• Private Companies; and</li><li>• PTT Telecom Netherlands.</li></ul>
<b>Cost of Development</b>	<p>Dutch Guilders 18.5 million (approximately US\$ 10 million).</p>
<b>Features</b>	<p>The system assists in the rationalization of trading communications for all modes of international transport, by providing electronic services (EDI). INTIS provides communication services to the entire transport chain, from shipper to consignee.</p>

### 5.7 INTIS, ROTTERDAM, THE NETHERLANDS

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<b>Message Standards</b>	<p>INTIS co-operates closely with the UN EDIFACT Board in the development of EDIFACT standard messages for use in the transport industry.</p> <p>INTIS can provide a complete set of standard messages which covers the basic operations in transport of general cargo.</p>
<b>Costs to User</b>	<p>The connection fee to the INTIS Network is Dutch Guilders 105. Usage charges of the network are based on connection time and volume of messages passed through the system.</p>
<b>Users</b>	<p>INTIS is available to all participants in the trade and distribution chain, and is now servicing 140 customers.</p> <p>The number of potential customers is almost unlimited given the volume of trade moving through the Netherlands.</p>
<b>Future Plans</b>	<p>INTIS is upgrading the network services with state of the art technology for adding value.</p>