European Cooperation
in the field
of Scientific and Technical
Research

COST 330

Teleinformatics links between ports and their partners

Final Report of the Action

European Commission
Directorate General Transport

A great deal of additional information on COST Transport is available on the World Wide Web. It can be accessed through the CORDIS server (http://www.cordis.lu/COST-Transport/home.html)
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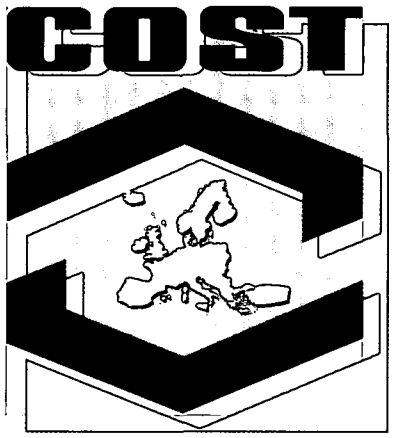


The COST 330 Management Committee wishes to express here its warmest thanks to each individual and community in ports and different organisations, for having participated in this COST Action.

Contents

Chapter 1: Introduction

The development of Information Technology has accelerated in scope over the past decade and now IT affects all aspects of our daily lives. The use of IT in the maritime industry is no exception - IT helps control many aspects of the work of ports and helps guide management decisions. IT has improved the competitive edge of European maritime industries and the short sea shipping industry and has sharpened-up the development of policy issues.

The COST Action 330 (Teleinformatics Links between Ports and Their Partners) was launched in October 1995.

1.1 Objectives of COST 330

The general objective of COST 330 was to review and assess the systems for interconnecting ports and their partners using various modes of communication - we include here all methods: phones, fax, electronic mail, etc. The aim, following the data analysis is to improve European maritime freight transport operations within the global logistic system through the exchange and dissemination of findings of COST 330 Action. The dissemination will take the form of a seminar, a report, and a CD-ROM (containing all our data, albeit in anonymous form, so allowing further scholarship to be promoted) and it will be available on the COST website.

COST 330 was to study the strategic thrusts relating to the use and development of IT for ports and their trading partners. It was:

- to study barriers raised against the implementation of Electronic Data Interchange (EDI) and
- to review the plans of port authorities and partners for their Information Systems and Telecommunications (IST) development, through the collation of information.

The findings should help devise recommendations for the development of tools and actions to enhance and facilitate the use of communications and telematics. Further COST 330 is to disseminate relevant information for commercial multimodal operations in the fields of waterborne industries with regards to the hinterland.

The first task of the Action was to analyse the IT management and the global intermodal linking processes in which ports are involved and to collate information on existing and planned developments of IT in the port communities.

General trends, like the role of ports currently and in the future, has been analysed. Key features and components of ports and their partners have been identified as well as the driving forces and critical issues relating to EDI and general IT development.

EU directives have recently focused on the management and control of hazardous cargo transportation in European sea-ways, ports and the hinterland - COST 330 addresses these issues, noting how ports and their partners address the directives.

1.2 Participants

The members of the Action were from 16 European countries. The representation was from:

- COST countries: Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Portugal, Romania, Slovakia, Slovenia, Spain and United Kingdom, and

- one institution from a non-COST country: the Bulgarian Ship Hydrodynamics Centre, Bulgaria.

Each of participating country signed a Memorandum of Understanding whereby their Governments agreed to co-ordinate their research effort towards meeting the aims of the COST 330 Action.

In addition, other countries offered data:

- The Netherlands, Sweden and Algeria.

The execution of COST 330, while supported by the European Commission, has been directed by a Management Committee drawn from the Membership - the latter comprised government representatives, academics, port representatives and other experts in the field.

To gather the data needed to analyse the logistics chains and to describe the operation of the ports, a large survey was conducted throughout Europe based on an extensive questionnaire. For management purposes the sea ports were grouped in to three geographic areas (the Baltic; the North Sea and the Atlantic Ocean; the Mediterranean and the Black Sea). The inland waterway ports of Europe constituted as a further group to better assess the reach of IT along the logistics chain. In total, 106 port communities replied to the questionnaire.

The respondents of COST 330 Action covered approximately 60 % of the total cargo volume of the countries which are participating in the study.

1.3 Beneficiaries of the COST 330 findings

The collation and dissemination of technical and economic data about the implementation of information systems and telecommunication should make the managers of ports and their partner firms more aware of the current scope and potential for computer mediated logistic systems which may materially benefit the management of their ports, and thus should benefit the integration of logistics management throughout Europe.

The recommendations based on the findings of COST 330 have been drafted on the basis of the following target audience:

The European Commission

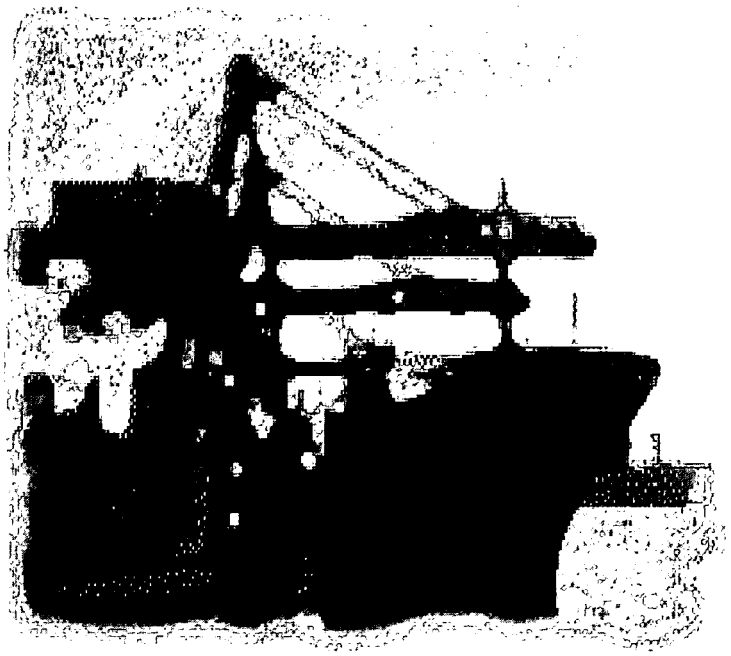
The National, Regional (and Local) Administrations

The Port Communities

European Transport and Logistics Sector

In addition, COST 330 produce also a set of recommendations allowing for the development of tools and actions to enhance and facilitate the use of Telematics in waterborne transport.

The content of the present report can also be found on the CD-ROM, which is included in this report. The CD-ROM also include, a great deal of additional results arising, from the analysis of the data collected by the questionnaire. To use the CD-ROM you need an INTERNET browser. To read the CD-ROM, simply insert it in your CD drive and it will run automatically.



Chapter 2: Executive Summary of COST 330 Port Community Telematics

The general objective of COST 330 was to review and assess the European port community telematics systems.

Ports, due to their position, are a vital part within the whole international transport network. They operate perhaps as the most important interface since they are the focal point for all players in the logistics chain, especially as most countries have a sea border and they exchange many millions of tonnes of goods. Ports facilitate the transfer of goods between sea and land transport, they help to move goods and particularly, many port community partners share information. The greater use of electronic communications and new information systems - Telematics in general - give the ports the opportunity to enhance the efficiency of their operations, to be more competitive and to speed up the end-to-end delivery of goods, and possibly make more safe the 'delivery' of people as they pass from hinterland to sea transport.

General overview of the COST 330 Port Communities
From the sample of the 106 ports in this Action (77 sea ports and 29 inland waterway ports) it is seen that most of the partners in the port communities use electronic data processing systems (EDP) for invoicing. Other software applications for improving transport operations such as berth allocation, yard management, export/import clearance, dangerous goods management, cargo tracing etc. are used to a varying degree by all port authorities; but the port community partners such as the port operators, stevedores, forwarding and trucking companies who also use these software applications do so but much less frequently. We find the level of integration of software applications in the sea port communities for core business very low, and it is 10% lower with regard to inland waterway ports. Some responding port authorities are without any software applications in some inland waterway ports, and in some maritime ports handling bulk cargo.

The large port communities - considered by bulk volume (tonnes) or number of containers they handle (TEUs) - have more advanced telematics than the small or medium size ports. The latter SME group also have SME partners so exacerbate the problem of low IT integration. In our sample the trucking and forwarding companies seem to have lower IT levels, and port authorities and port operators/stevedores the highest level.

At a national level the railway companies and customs show quite a high use of basic software applications. As they tend to have a reasonable IT staff level they probably can maintain their systems satisfactorily. But we should not be complacent on this point.

Often this variability and/or low use can be explained by the fact that the port community partners (as reported) have old software and old hardware, and employ too few IT staff for the development and maintenance of their telematics systems. In most cases these systems are not outsourced, and are not planned to be outsourced: so they are not brought up to date in performance terms.

EDI, Internet, telecommunications

We can see from our study that EDI is used by 28 port authorities and by 27 stevedoring companies in sea port communities, reducing to only one EDI user in the inland waterway port communities. Regarding land based operators, no trucking companies reported that they use EDI with the port partners - yet 65% of the freight arrives or leaves ports by road. Only two national railways practice EDI in the 19 participating countries notwithstanding our statement above regarding the rail companies. 11% of port communities have forwarders which use EDI, though mainly with the customs.

In half of the participating countries the customs authorities are strongly aligned to the use of EDI. Here the main type of electronic data concern documents or messages relating to the manifest and the customs declarations.

The Edifact standard format is rarely predominant in the sampled port communities, its use is less than half that of proprietary formats. The automatic exchange of information is not predicted to be significantly increasing in the short term as the cost/benefit relations of fully integrated EDI are not well understood nor accepted, and the Edifact messages are perceived as being too complex.

Most participating port community partners use their national PTT networks, less than 10% are using Port Community Systems (PCS) or Value Added Networks (VAN) for their automatic data and message exchange. It was reported that the telecommunication costs and the connectivity problems for EDI remain the critical issues in the port communities.

Port community partners reported a low use of Internet/Intranet when the investigation was executed, but it is now changing rapidly. It has a high priority among all port community partners for future use: for instance, two ports forecast that they will stop EDI development and they will concentrate developments on Internet/Intranet.

Telecommunication cost and infrastructure, and software still are the greatest economic barriers against the development of advanced information systems and telecommunications within the port community despite the significant efforts of national governments and the EU Commission in launching R&D programs and supporting projects for the seamless integration of informatics.

Problems and challenges

The differentiation in the structure and organisation of the port authorities in Europe often acts as a barrier against interoperability between different partners. This is not dependant upon their operations being within one port community (ie the many local partners in a port) or between different port communities (at a distance in the same country, or between countries).

Barriers exist against rapid acceptance and implementation of advanced information systems and telecommunications in the port communities, especially in the small ports (in the survey 72% of inland waterway ports, and 38% of sea ports handled less than 5 million tons of cargo in 1995, and so were defined as 'small'). These barriers are due often to a lack of awareness or appreciation of how integrated telematics might support the local management in the port. And further, how telematics can support the logistics chain in which the port plays a vital role.

The symptoms are seen as old software and old hardware, the lack of interoperability and the low levels of IT support staff.

Technological hurdles for a long time have prevented data exchanges between different companies. Information systems interoperability is quite difficult to achieve: different character codings, different file formats, different operating systems and data communication procedures are common factors. Also knowledge and specialist IT staff are necessary to update common functions like accounting or billing, and to integrate major business aspects - quayside management, and tracking/tracing for instance. This is quite impossible without modern equipment and software.

Logistics operations throughout the port involve the exchange of a high volume of data between heterogeneous parties. Most of the partners in port communities are small and medium sized companies. These are more visible in the small ports - especially the forwarding and trucking companies: they often consider that the fax offers an adequate level of service at low cost, particularly if they have poor, inappropriate telematics equipment.

PCS

To obviate obvious impediments, large ports have generally implemented a PCS. They have done this by sharing information resources and teams of computer experts so small operators clustered in the port are able to reach the required critical mass. However it is costly to implement PCSs because they have to integrate all types of commercial operations. Also the success of a PCS demands the commitment of all partners that is not always freely given. In our survey, port authorities were the only partners who expressed willingness to be a shareholder in a PCS company - thus we perceive a continuing reluctance of the totality of the community to join the PCS. However this statement should be tempered by the fact that in many countries in Europe the ports are still within the control of their governments - so the questioning joining a private venture to aid the control of a state-owned enterprise may evoke a negative response - notwithstanding the benefits of a PCS. The situation is likely to be different in countries with less state control upon the ports. Nevertheless PCS, rightsizing, connecting with customs, and hosting new Internet services implemented in total co-operation with all partners in the port communities could increase the use of telematics for small and medium sized ports, and in parallel, the port partners' internal enterprise IT systems.

The relatively large number of operators in the logistics chain demands a high level of dialogue and co-operation with regard to the technical implementation. There exists a need to create interoperable telematics tools which support and service appropriately the businesses of the port communities. The co-operation between all port partners to build port telematics communities in conjunction with special training could be supported by the telematics driver in a port community; but it may be better mandated by governments and the European Commission.

Customs authorities can improve the use of EDI by using Edifact standards, especially since they can mandate this operation on others and so aid their international operations. Further, in the EU, the port authorities are in charge of the management of dangerous goods under the EU HAZMAT directive. So jointly these two authorities could be the drivers for the promotion and use of advanced IT in the port communities.

Harmonisation of the working routines

To allow ports of all sizes to operate and to interlink in the end-to-end transport logistic chain and to be the supplier of "one stop shopping" for telematics thus to provide better service to clients it seems necessary to impose a certain harmonisation for the facilitation of procedures and trade practices. The European Commission and national governments could propose global solutions to reduce redundancy in data handling, to simplify documentation, and to streamline operations.

Training

A real telematics gap exists between large and small sea ports (and inland waterway ports). It is vital that a small and medium sea port and inland waterway port IT awareness campaign must be proposed. This will disseminate the information of 'best practices' and information about port community telematics. In turn this will enhance the co-operation program between countries by simplifying trade procedures.

A large effort must also be made to support the training for the general and appropriate application of IT - again with special regard to the SMEs in the maritime industry. The R&D programme of the European Commission must support projects related to the implementation of tools which incorporate a training target, not concentrating only on the development of high-technology. They should also develop an appropriate assessment of the real role of telematics in small sea and inland waterway port communities which might introduce R&D if only they understood the real benefits.

The European Commission should propose initiatives for the definition of the strategy of implementation of global IT - not only for the EU in general, but also for the Central and Eastern European countries and the MEDA countries.

Chapter 3: Scope and Working Method of COST 330

As the COST 330 Action on ports as an interface the port community has been assumed to compromise:

- *Port Authorities*
- *Stevedoring companies and port operators*
- *Shipping agents and companies*
- *Forwarding companies*
- *Trucking companies*
- *Railway companies*
- *Customs Authorities*
- *River and channel authorities for the Inland Waterways*

3.1 Participating countries

The work undertaken by COST 330 is based on data provided by the 18 European countries shown on the map in chart 3.1.1, and also on data provided by Algeria.

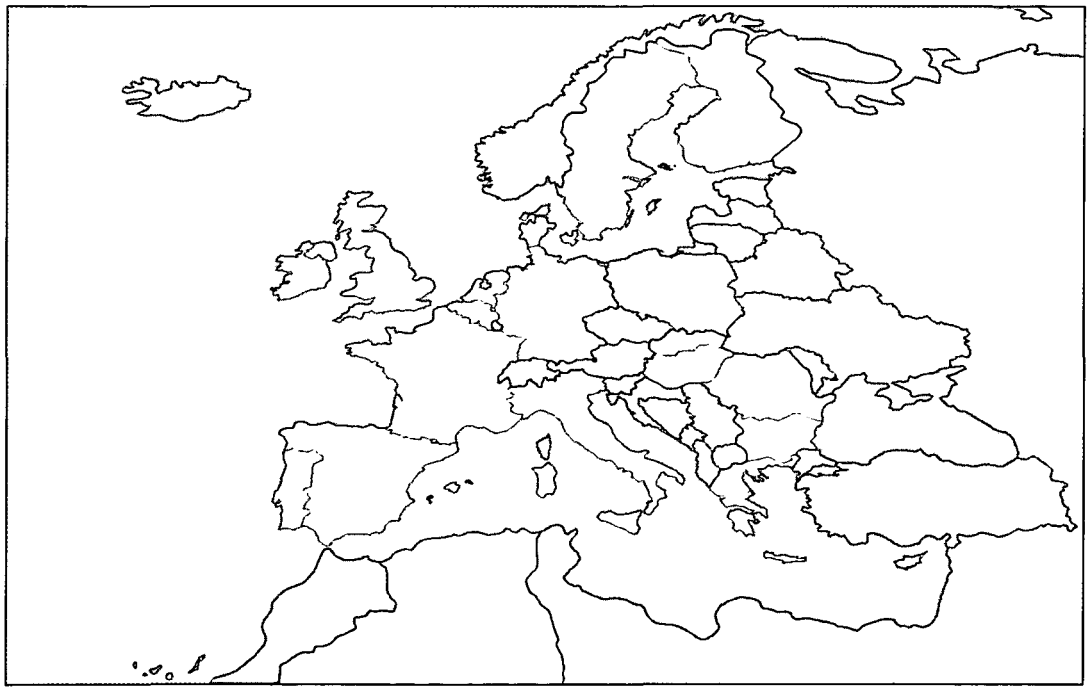


Chart 3.1.1 - Participating Countries

The extensive study was conducted by questionnaire throughout Europe and in order to organise the collection of data a distinction was drawn between sea ports and inland waterway ports. For management purposes the sea ports were grouped in to three geographic areas (see below); in addition, a separate group studied the inland waterway ports.

Within this categorisation, approximately 700 detailed answers from 19 countries (18 European countries plus Algeria) were returned to be analysed. Individual companies and port partners were selected to be representative of each of the 106 ports - which cover small, medium and large ports (this group includes the mega ports) in the participating countries (see four maps below). The selection of ports was pragmatic - in the larger ports there are many partners, possibly several hundred - time did not allow the Action to approach all these enterprises. As expected, the majority of the ports belong to small and medium sized categories.

The definition of this classification is given in Chapter 4.1. Port Profile.

All in all, 77 sea ports and 29 inland waterway ports, and their partners, participated in and were analysed in the COST 330 Action.

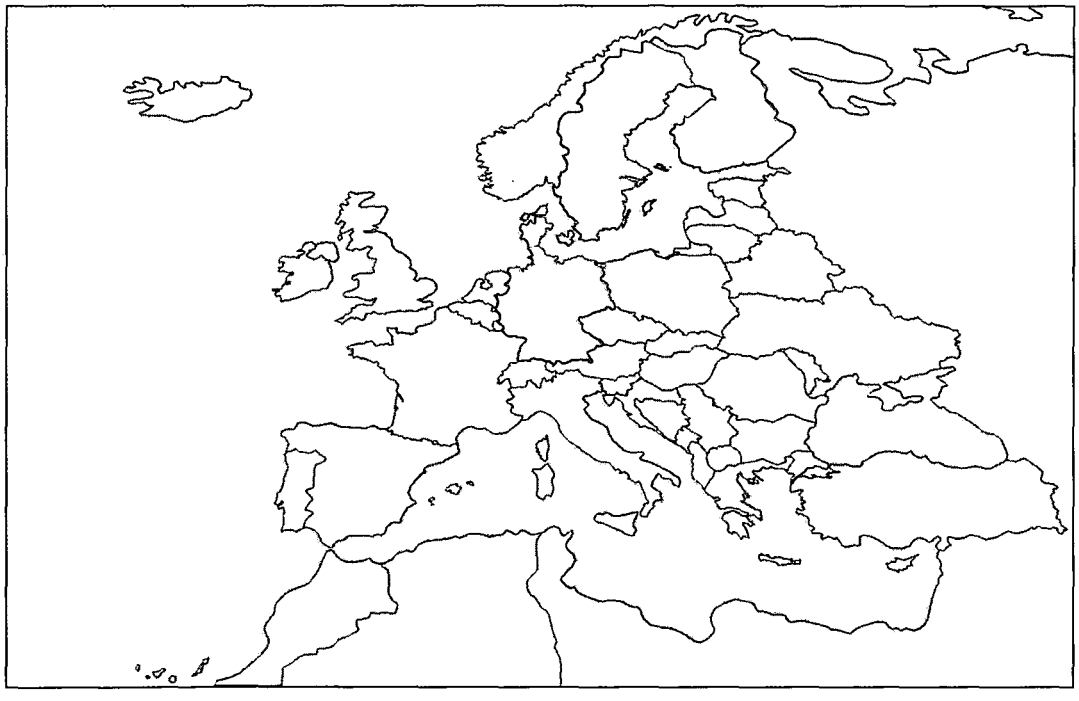


Chart 3.1.2 - Baltic Sea (23 ports): Denmark (2), Finland (9), Germany (6), Sweden (6)

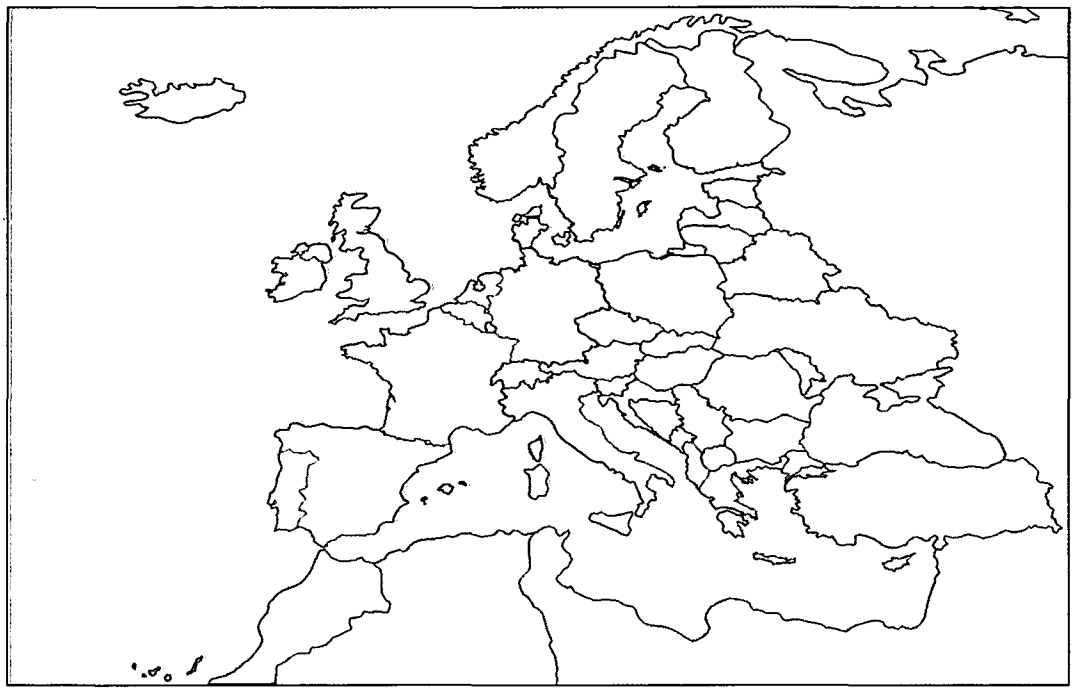


Chart 3.1.3 - North Sea & Atlantic Ocean (33 ports): Belgium (2), France (4), Germany (6), Ireland (4), the Netherlands (1), Portugal (4), Spain (3), United Kingdom (9)

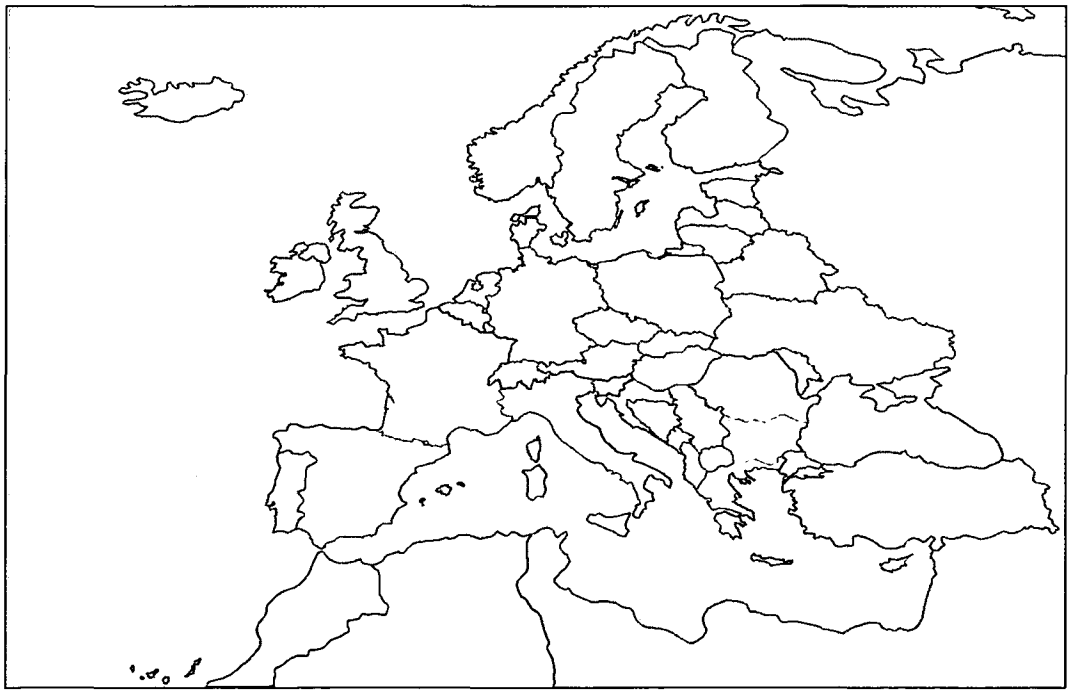


Chart 3.1.4 - Mediterranean & Black Sea (21 ports): Algeria (1), France (2), Greece (4), Italy (8), Romania (1), Slovenia (1), Spain (4)

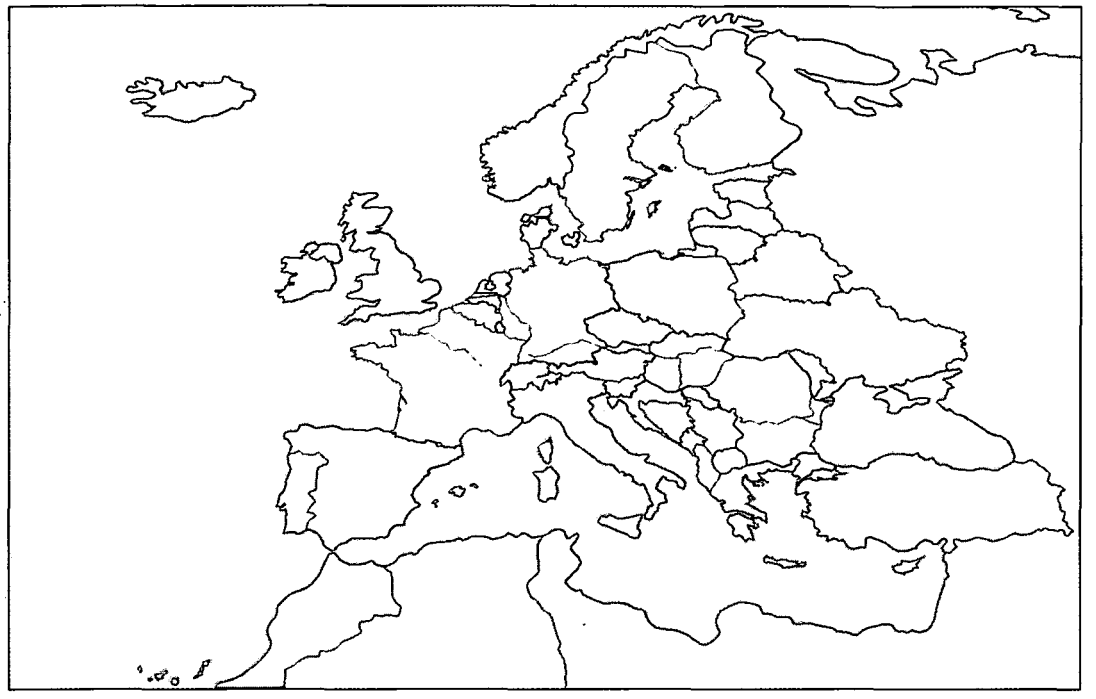


Chart 3.1.5 - Inland Waterways (29 ports): Belgium (4), Bulgaria (1), Finland (4), France (2), Germany (8), Hungary (4), Romania (3), Slovakia (2), Sweden (1)

3.2 Work programme of COST 330

According to the Memorandum of Understanding, the managers of the COST 330 Action were to consider:

Method:	To establish the elements essential to describe the ports' IST projects and their general operations, so as to ensure comparability enabling their features to be highlighted.
Evaluation:	To draw up a critical bibliography; later to categorise these references to help assess the findings of the project.
Identification:	To analyses the technical aspects of IST initiatives To analyse the economic and technical links between the various partners To analyse the success or failure of IST projects in ports To analyse interactivity To analyse generic modules To analyse the information strategies and organisation of all the companies involved with the maritime transport To analyse the quality of service and related cost/benefits To analyse the quality and currency of the technology employed
Future:	To compile an awareness of pertinent new technology To assess the critical issues with respect to the impact of new technology on ports and their partners

3.3 Organisation

The implementation of a COST Action is supervised and co-ordinated by a Management Committee composed of no more than two representatives of each signatory who ensure the scientific co-ordination of the Action at the national level. Membership of the COST 330 Management Committee comprised of government representatives, academics, port representatives and other experts in the field.

For the management of the work, the following groups were formed:

Project Group	Supervision of the regional work - to report to the Management Committee
Regional Working Groups	Co-ordination of the regional activities
Analysing Group	Development of the Analysis Method To undertake the Analysis To produce the Final Report

The position of 'Project Manager' for COST 330 was financed by the Finnish Ministry of Transports and Communications.

3.4 The questionnaire

(The questionnaire may be accessed in its full detail on the CD-ROM, inserted at the end of this report.)

The data was derived from 106 completed questionnaires. The questionnaire, comprising some 50 pages, was subdivided in to 23 questions blocks, of which 9 dealt with general port statistics, and 14 concerned Information Systems and Telecommunications. The questions are as follows:

Statistics:

· ***Annual cargo volumes 1995***	The size of the port and the cargo volumes per commodity;
· ***Annual cargo volumes 1995, transit cargoes***	The magnitude of the transit cargoes in the port and the cargo volumes per commodity;
· ***Annual cargo volumes 1995, unitised cargoes***	The volumes of the unitised cargoes. Number of passengers and number of trucks/cars;
· ***Annual cargo volumes 1995 unitised cargoes, transit***	The volume of the unitised cargoes. Number of passengers and number of trucks/cars;
· ***Main trading areas total movement of cargo 1995***	The geographic areas which cargo/shipping lines are coming from/sailing to;
· ***Hinterland transports annual volumes 1995***	How cargo is arriving at the port from the hinterland or how cargo is leaving the port to hinterland. Six types of inland transport modes were noted;
· ***Number of partners in the port***	A snap-shot of how many partners are working in the port. The total number of employees (rough estimate) given by group of partners;

· *Role of partners in the port*	Who is doing what in the port. Some port partners may have several roles;
· *Role of partners in the port future development.*	The expected changes to the different roles of the port partners;

Information Systems and Telecommunications:

· *IST (Information systems and telecommunications) system description, on application level*	The software (sw), type of operating system, type of hardware and who supplied the sw;
· *IST system description: application level, outsourcing future development*	Plans for outsourcing the maintenance and software operations. Same question for the systems operations;
· *Communication between Ports and partners*	The volume of transactions (as paper documents) sent to the partners and how the documents are sent currently;
· *Communication between ports and partners, network*	What types of networks and which means of communications are used;
· *Communication between ports and partners, Edifact or non-Edifact messages*	Noting the currently used Edifact or non-Edifact messages and the planned Edifact or non-Edifact messages;
· *Main problems in IST applications*	Put to current users of EDI and partners, or those who had plans to start implementing EDI. The four question groups were: hardware and software, telecommunication; message exchange, application interfaces;
· *Main areas for future development*	Future areas of IST which the port and the partners were to develop in the future;
· *Hazmat directive, implementation port authorities current situation*	The current situation describing how the port authorities were managing the dangerous goods information and the different phases of this information;
· *Hazmat directive implementation, port authorities future (2years) situation*	How the dangerous goods management will be working in the participating ports in the close future (2 years);
· *EDI investments and operating costs of EDI applications*	The current cost distribution and the future cost distribution of EDI investments and EDI operating costs;
· *Cost elements of EDI applications on operative level*	The cost elements of EDI applications at the operative level;
· *Internet/Intranet applications*	A snap-shot of the current use of Internet or Intranet; and plans for the future use of Internet and Intranet;
· *Legal aspects of EDI*	How the legal aspects of EDI are implemented on a practical level. The legal aspects of EDI have a local/national implementation;
· *Port Community Systems (PCS) future aspects*	The partners' willingness to use the Port Community Systems The potential ownership in/of PCS companies.

3.5 Acceptance of the questionnaire and processing of the answers

The questionnaire was approved by the Management Committee in July 1996 and the first deadline for replies was November 1996.

Considering the delays to obtain the necessary recent statistics and in order to have the same year of reference for each participating country, 1995 was selected as the most representative year for the statistical part of the questionnaire. The analysis was made in 1997/98.

The questionnaire were pilot tested in the 4 regional working groups where representatives of the ports gave their comments to the questionnaire.

The answers were validated on three occasions:

Initial screening of the data	The accuracy of the replies were controlled by comparing them with other ports in the same country. In many cases a second and third round of data gathering were needed to complete individual replies.
At data entry	After screening the data was structured and entered in the database. Errors were questioned and controlled.
Exploratory Data Analysis	After the data was entered into the database, the first graphs/analyses were reviewed and the raw data revised, if necessary.

All respondents were guaranteed total confidentiality with respect to their data. It follows that individual data have been aggregated in such a way as to meet this guarantee.

3.6 Who answered the questionnaire?

Most commonly, the persons in charge of IT at the ports collected the information for the questionnaire; and suggested the most appropriate person at each of the partners of the port community: this varied from country to country. Where there were problems of data collection (getting the full set of data of a single port, for instance, due to lack of port personal, time, etc.) one person was selected to be a representative of the whole port community, usually from the Port Manager's office, who had good knowledge of all the activities of the port.

Questions were asked at a very detailed level. This caused delays and to a certain extent this led to variations in interpreting - which is typical in this kind of survey. Hence the care taken above to validate the data as mentioned above.

Chapter 4: IST Description of the Port Community Partners

Introduction

The results from the questionnaire are reported in this chapter. The results from the questions have been grouped into 5 sections of chapter 4:

4.1 Port Profile	Clustering of the ports for the purpose of the analysis
4.2 IT Profile	IT of the Port Community Partners
4.3 EDI Profile	EDI use in the Port Communities
4.4 Hazmat Profile	Dangerous Goods Information Management in the Port Communities
4.5 Future IT Profile	Future Development Areas in the Port Communities.

One of the main objectives of the analysing team was to find how the 5 different types of profiles affect each other and strength of the correlations between the profile elements.

The different profiles and their dependencies between each other are described below.

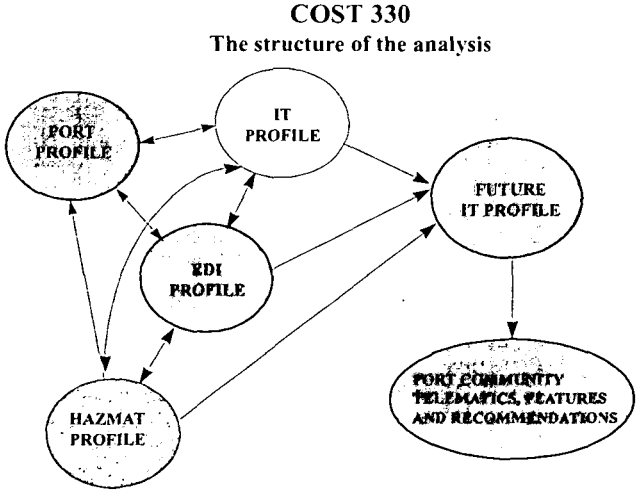


Chart 4. 1 Structure of the analysis

The analysis over all the profiles will generate a set of recommendations and a set of critical issues which are presented in the conclusions to this chapter.

To the reader: Please note that,

- the selected and interviewed participants of this study represent only a sample of port community partners;
- the highest results in the graphs are always in the left hand side of the graph.

4.1 Port Profiles

4.1.1 Introduction

The sample of 106 ports comprises 77 sea ports and 29 inland waterway ports covering 19 countries. The sea ports have been analysed separately from the inland waterway ports.

For the purpose of the analysis both the sea and inland waterway ports have been grouped in three clusters (i.e.: small, medium and large ports). Port Profiles are detailed on the following pages.

Clustering of the ports

For the clustering, different definitions have been used, i.e.:
- *annual cargo volume*
- *annual containerised cargo volume*
- *number of partners in the port community*
- *number of employees working in the port community*
- *number of sailings per month*

Further analyses have been undertaken as follows:
- *cargo volume per commodity groups*
- *breakdown of cargo volume between import and export*
- *hinterland cargo volume between import and export*
- *export cargo volume per commodity groups*
- *import cargo volume per commodity groups*
- *main export trading areas*
- *main import trading areas*

4.1.2 Geographic distribution of the ports

BALTIC SEA (23 PORTS)			
DENMARK	2 ports	GERMANY	6 ports
FINLAND	9 ports	SWEDEN	6 ports
NORTH SEA AND ATLANTIC OCEAN (33 PORTS)			
BELGIUM	2 ports	PORTUGAL	4 ports
FRANCE	4 ports	SPAIN	3 ports
GERMANY	6 ports	The NETHERLANDS	1 port
IRELAND	4 ports	UNITED KINGDOM	9 ports
MEDITERRANEAN SEA AND BLACK SEA (21 PORTS)			
ALGERIA	1 port	ROMANIA	1 port
FRANCE	2 ports	SLOVENIA	1 port
GREECE	4 ports	SPAIN	4 ports
ITALY	8 ports		
INLAND WATERWAYS (29 PORTS)			
BELGIUM	4 ports	HUNGARY	4 ports
BULGARIA	1 port	ROMANIA	3 ports
FINLAND	4 ports	SLOVAKIA	2 ports
FRANCE	2 ports	SWEDEN	1 port
GERMANY	8 ports		

4.1.3 Total annual cargo volume in tons, 1995

The objective of this question is to record the size of the port and to describe the total annual cargo volume.

A full statistical analysis of the transit cargoes could not be completed due to the fact that in many European countries there are no statistics collected on 'internal' transit cargoes - due to the opening of European borders to free transhipments.

Both the sea ports and inland waterway ports have been grouped based on their total annual cargo volumes. The volume cut-offs were decided subjectively.

- Large ports (including megaports) — more than 15 million tons (megaports > 70 million tons)
- Medium ports — 5 million tons - 15 million tons
- Small ports — less than 5 million tons

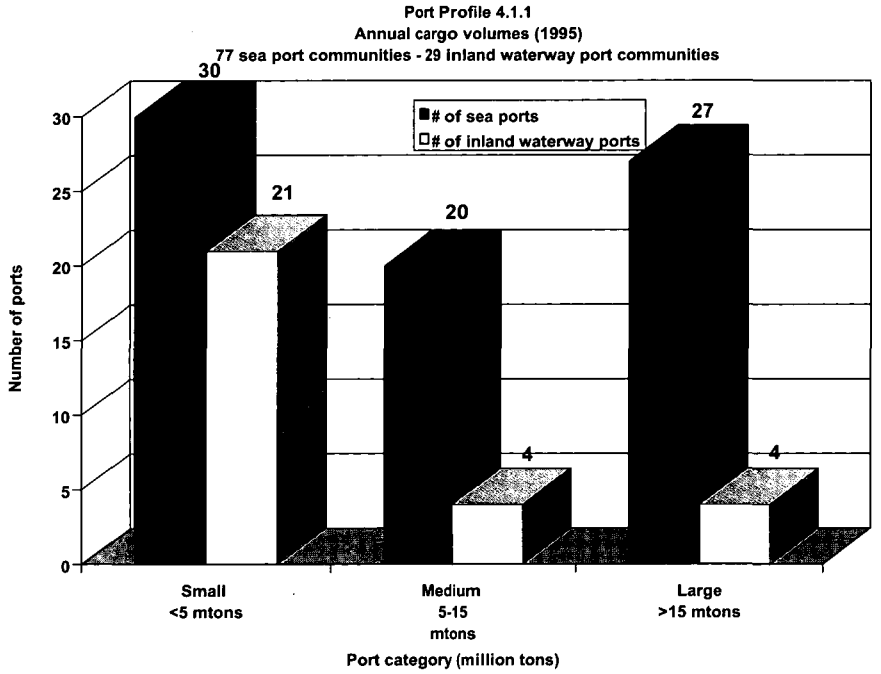


Chart 4.1. 1 - Distribution of 77 sea and 29 inland waterway port communities according to total annual cargo volume, 1995

A more detailed analysis - according to the annual cargo volumes - shows that 19 sea ports and 18 inland waterway ports have less than 2 million tons of cargo. 6 sea ports and 1 inland waterway port have more than 50 million tons.

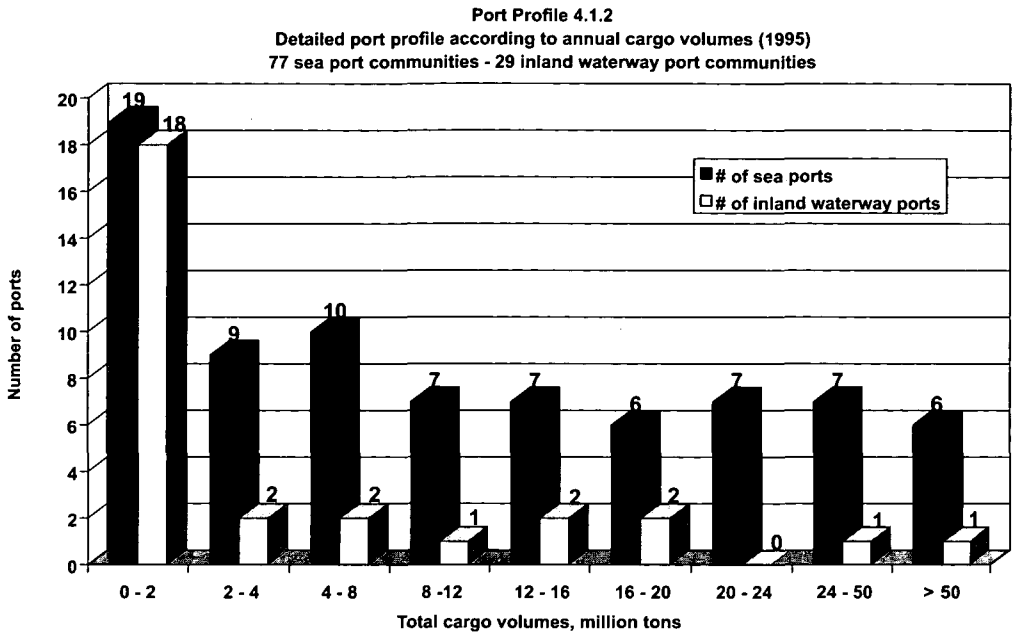


Chart 4.1. 2 - Detailed classification according to annual cargo volume, 77 sea and 29 inland waterway port communities, 1995

S u m m a r y
Annual cargo volumes 1995

On the basis of the definition given above, the survey includes:
Sea ports: 30 small, 20 medium and 27 large
Inland waterway ports: 21 small, 4 medium and 4 large.

4.1.4 Total annual containerised cargo volume (number of TEUs), 1995

The objective of this question is to record the volumes of the unitised cargoes. The number of containers is reported in TEUs (=twenty foot equivalent units).

Both the sea ports and the inland waterway ports are grouped according to the number of TEUs as follows:

· Large ports (including megaports)	more than	200.000 TEUs (megaports >1 million TEUs)
· Medium ports	50.000 -	200.000 TEUs
· Small ports	less than	50.000 TEUs

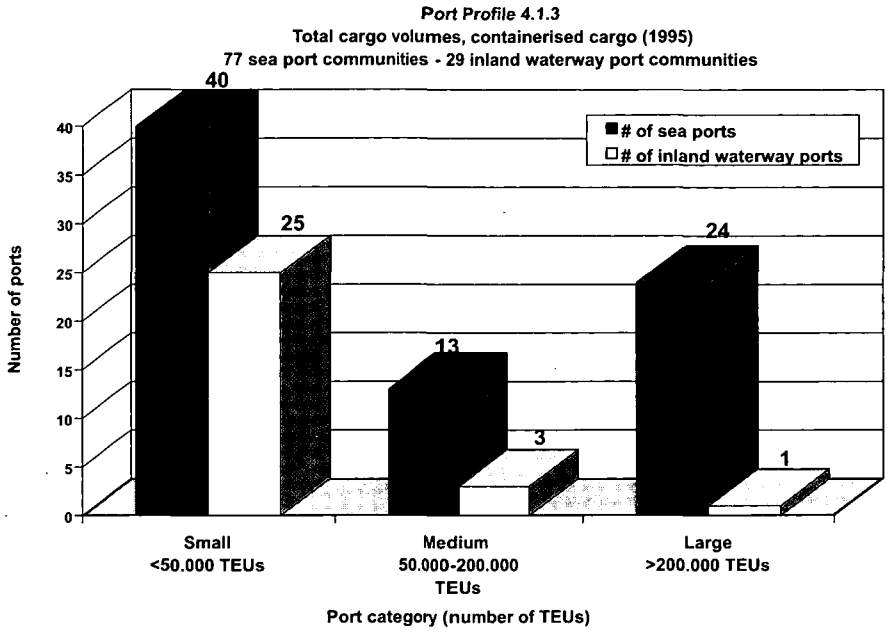


Chart 4.1.3 - Distribution of 77 sea and 29 inland waterway port communities according to total annual containerised cargo volume, 1995

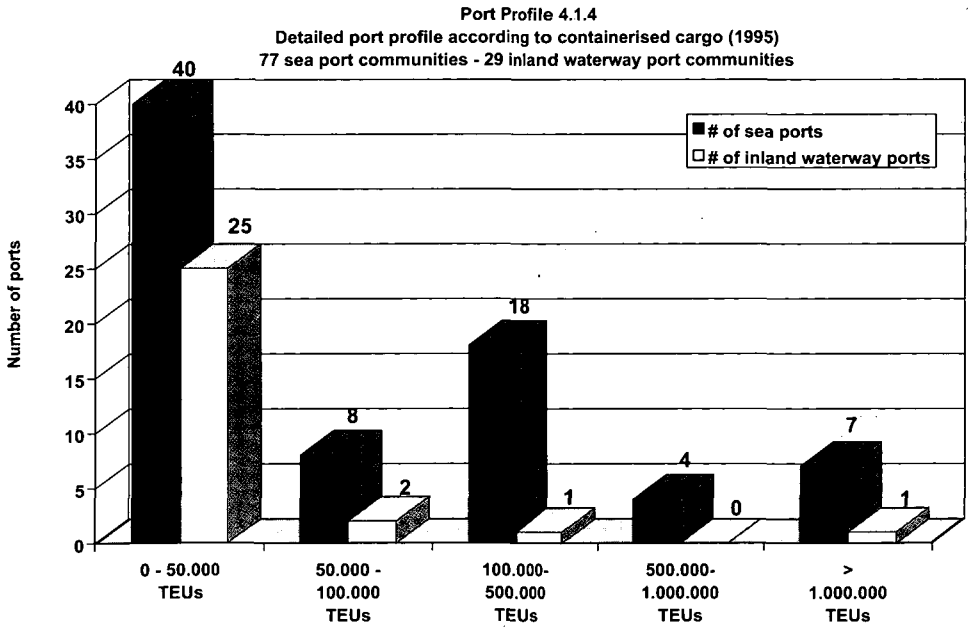


Chart 4.1.4 - Detailed port community classification according to total annual containerised cargo volume, 77 sea and 29 inland waterway port communities, 1995

S u m m a r y
Containerised cargoes

Sea ports
The 4 European mega-ports handle a large number (= >1 million TEUs) of containers. Otherwise in the data there are 40 small ports (including 22 ports, which do not handle containers), 13 medium ports, and 24 large ports (as defined above, which also contain the mega ports).

Some of the European large ports which handle both bulk cargoes and containers tend to be dominated by bulk cargoes (total tons) rather than by unitised cargo (tons in TEUs).

Inland waterway ports
Only 15 of the 29 inland waterway ports handle containers; and in only one of the inland waterway ports is the number of TEUs of significance.

Of the total 106 analysed ports there are 36 ports (29%) which do not handle containers.

4.1.5 Number of partners in the port communities, 1995

The main objective of this question is to estimate how many partners are working in the port community.

The partners in the port communities are:

- *Port authority*
- *Port operator/stevedoring company*
- *Shipping Agent*
- *Forwarding company*
- *Trucking company*
- *Railway company*
- *Customs Authority*

We must state that 'partners' does not necessarily mean a legal entity, but more generally 'business partners' between whom goods are exchanged, or by whom goods are handled. These port community partners are doing business with each other inside the port community and also with companies in the hinterland.

The sea and inland waterway ports have been grouped according to the number of partners:

· Large ports	more than	200 partners
· Medium ports	50 partners	- 200 partners
· Small ports	less than	50 partners

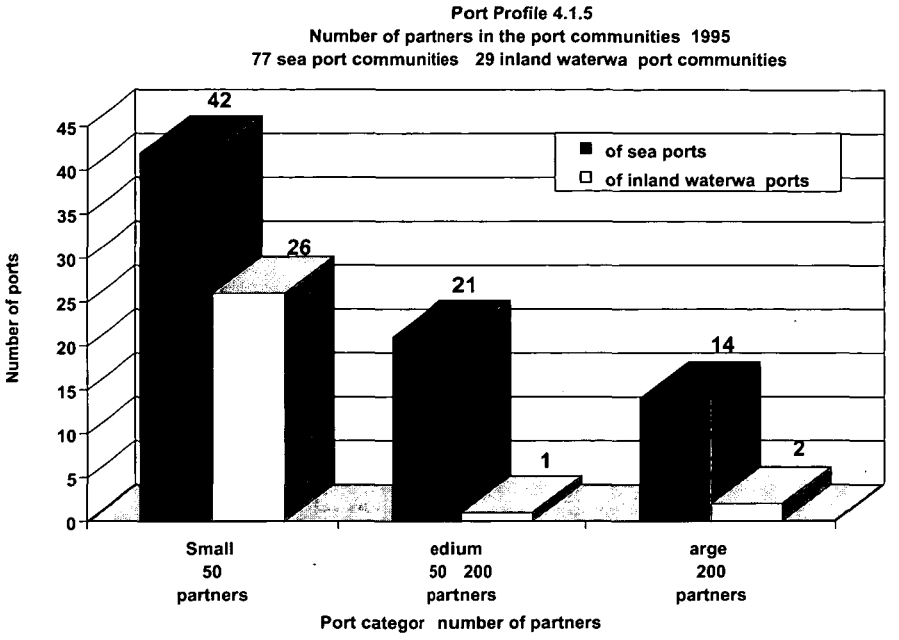


Chart 4.1.5 - Distribution of 77 sea and 29 inland waterway port communities according to number of partners in the port communities, 1995

S u m m a r y

Number of partners in the port communities

Sea ports

In this analysis 42 ports can be described as small, 21 as medium and 14 as large.

The largest port communities have about 400-500 companies and authorities (i.e. partners) doing business in the port and associated business areas. In the smallest port communities the number of partners may be 5-10 companies and authorities.

Inland waterway ports

Most of the ports (26) in the sample of inland waterway ports (29) have about 15 to 20 companies and authorities. On the basis of the above definition, they are regarded as small.

4.1.6 Number of persons employed by the port community partners, 1995

The main objective of this question is to show how many persons are working in the port. The total number of employees (as a rough estimate) will necessarily be dependant on the number of partners.

The grouping of the ports is by the number of employees in the ports including all partners:

· Large ports	more than	5.000 employees
· Medium ports	1.000 -	5.000 employees
· Small ports	less than	1.000 employees

The graphical presentation of the analysis is shown only on the CD-ROM as:

* Chart 4.1.6 - Distribution of 77 sea and 29 inland waterway port communities according to the number of employees in the port community, 1995

S u m m a r y
Number of person working in the port communities

Sea ports
According to this measure - 41 ports may be described as small, 27 as medium and 9 as large. The largest port communities have between 14000-18000 employees in their port/partner companies. In the medium size ports there are about 4000 such employees, and in the small ports the number of employees is usually less than 500.

Inland waterway ports
22 of the inland waterway ports have less than 1000 employees, 4 ports have between 1000 and 5000 employees, and there are 3 ports with more than 5000 employees (it should be noted that these three ports are associated with sea port activities).

4.1.7 Number of sailings per month, 1995

The objective of this question is to note the frequency of sailings per month to/from all destinations.

The ports have been categorised by the number of sailings per month:

· Large ports	more than	500 sailings per month
· Medium ports	100 -	500 sailings per month
· Small ports	less than	100 sailings per month

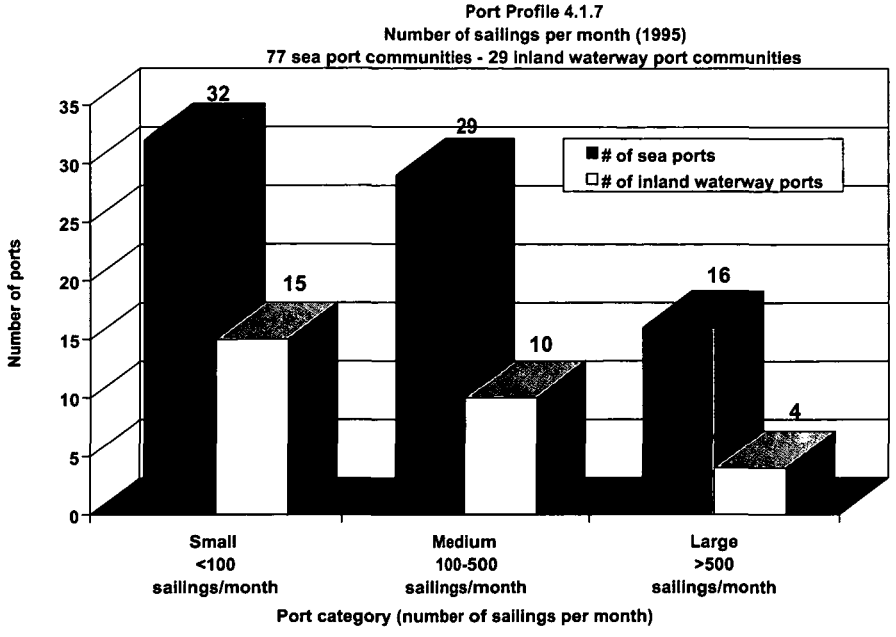


Chart 4.1. 7 - Distribution of 77 sea and 29 inland waterway port communities according to the number of sailings per month, 1995

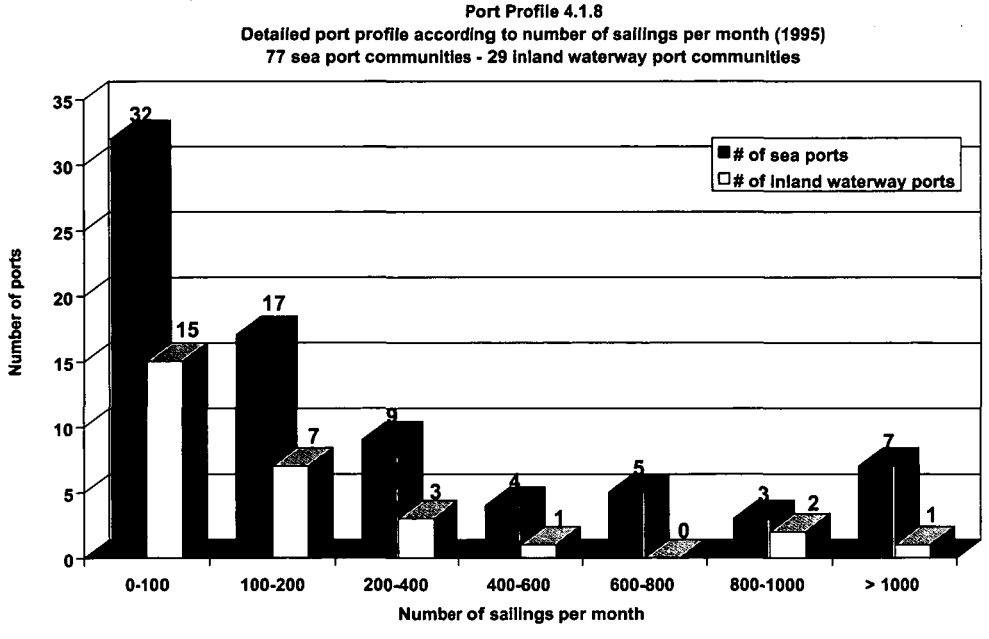


Chart 4.1. 8 - Detailed port classification according to the number of sailings per month, 77 sea and 29 inland waterway port communities, 1995

S u m m a r y
Number of sailings per month

Sea ports
According to the number of sailings, 32 sea ports are small, 29 are medium and 16 are large.

In large ports there are daily sailings, both arrivals and departures, to the main destinations: indeed there may be 8-12 sailings per day from all shipping lines to these main destinations. In the medium and small ports there are 1-3 weekly sailings to/from the main destinations.

In ports specialising in the bulk cargo the sailing frequency is between 1 and 3 per month.

In ports where there is a roro service (roll-on/roll-off) the sailing frequency is 3-12 per week.

Inland waterway ports
According to the frequency of sailings, 15 inland waterway ports are small, 10 are medium, and 4 are large.

In the inland waterways there are normally at least daily sailings to/from the main destinations. But in the inland waterway ports which are part of a sea port, the sailing frequency is more than 500 per month.

4.1.8 Total cargo volume per commodity group, 1995

The objective of this question is to categorise the size of the port and to describe the cargo volumes of the port per commodity group.

The cargo volumes of each port category (small, medium, large) have been divided into three commodity groups (all in tonnes):

- *Solid dry bulk*
- *Liquid bulk*
- *General cargo*

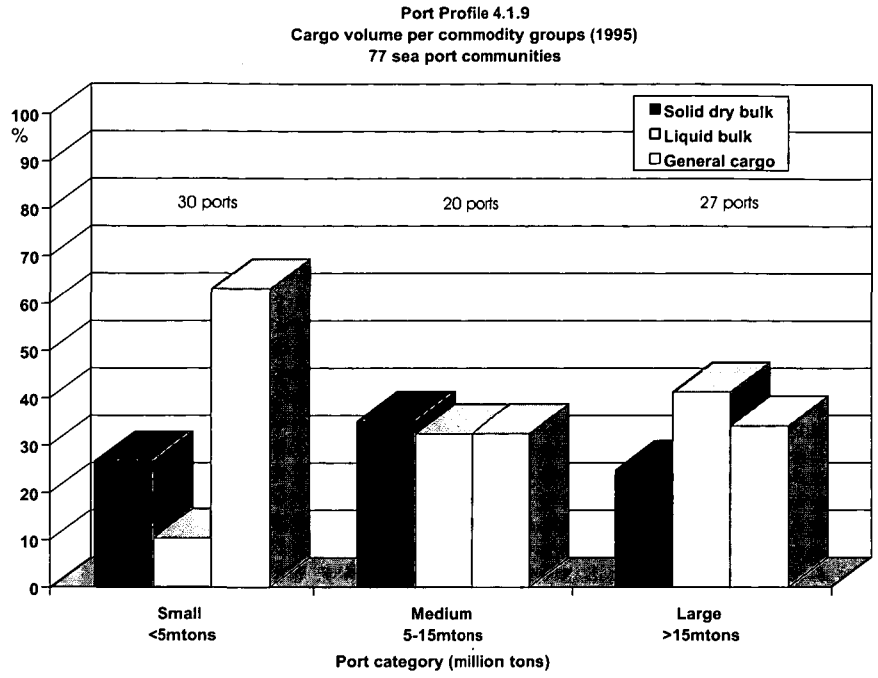


Chart 4.1. 9 - Total cargo volume per commodity groups, 77 sea port communities, 1995

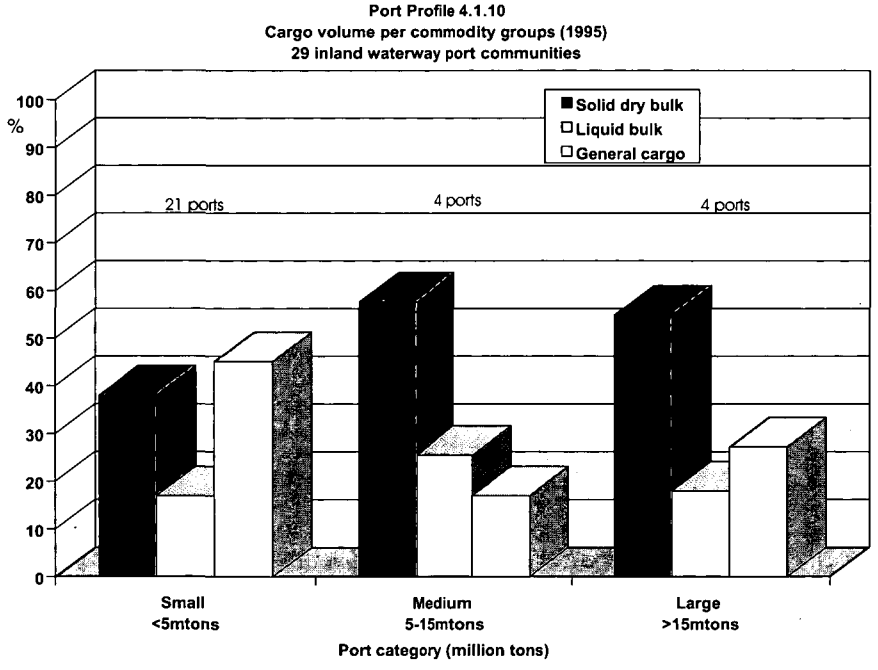


Chart 4.1. 10 - Total cargo volume per commodity groups, 29 inland port communities, 1995

S u m m a r y
Cargo volume per commodity groups

Sea ports
In most of the medium and large sea ports, bulk cargoes represent 2/3 of the total cargo volume. General cargo, including containers, represents about 1/3 of the total cargo volume. In contrast, in the small sea ports general cargoes dominate with about 2/3 of the total cargo volumes, thus the bulk cargoes are about 1/3.

Inland waterway ports
In the medium and large inland waterway ports the largest commodity group is dry bulk cargo (55%). The general cargo dominates in the small inland waterway ports (45 %).

4.1.9 Total cargo volumes, breakdown of hinterland transports, 1995

The main objective of this question is to describe how cargo arrives or leaves the port with respect to the hinterland: 6 types of inland transport modes are mentioned:

- *Trucks*
- *Railways*
- *Inland waterways*
- *Pipelines*
- *Conveyor belts*
- *Other types of transport*

Port Profile 4.1.11
Total cargo volume, breakdown of type of hinterland transport (1995)
77 sea port communities

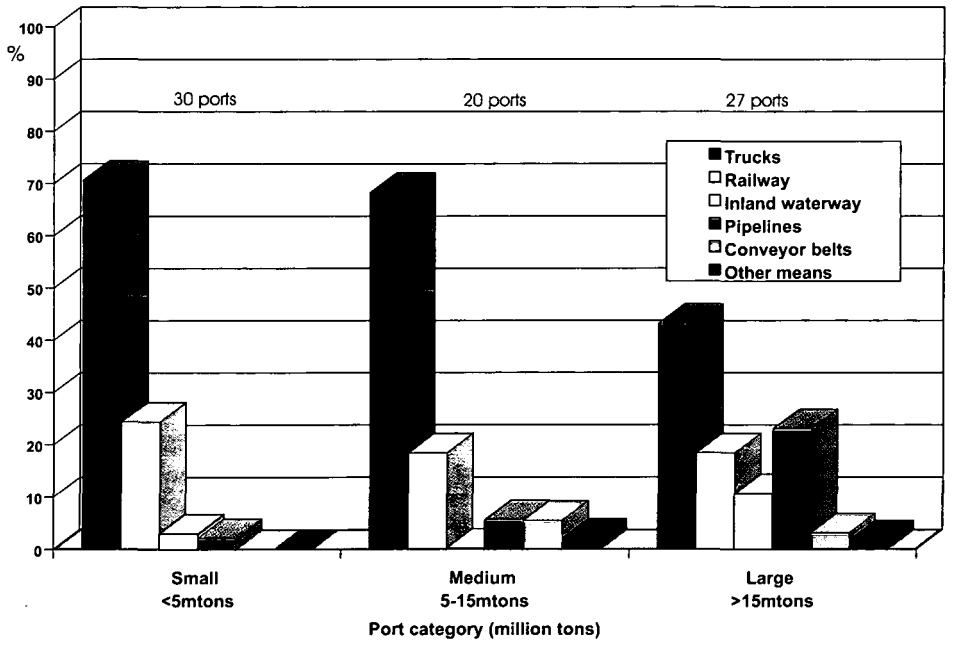


Chart 4.1. 11 - Distribution of the hinterland cargo volume per type of hinterland transport, 77 sea port communities, 1995

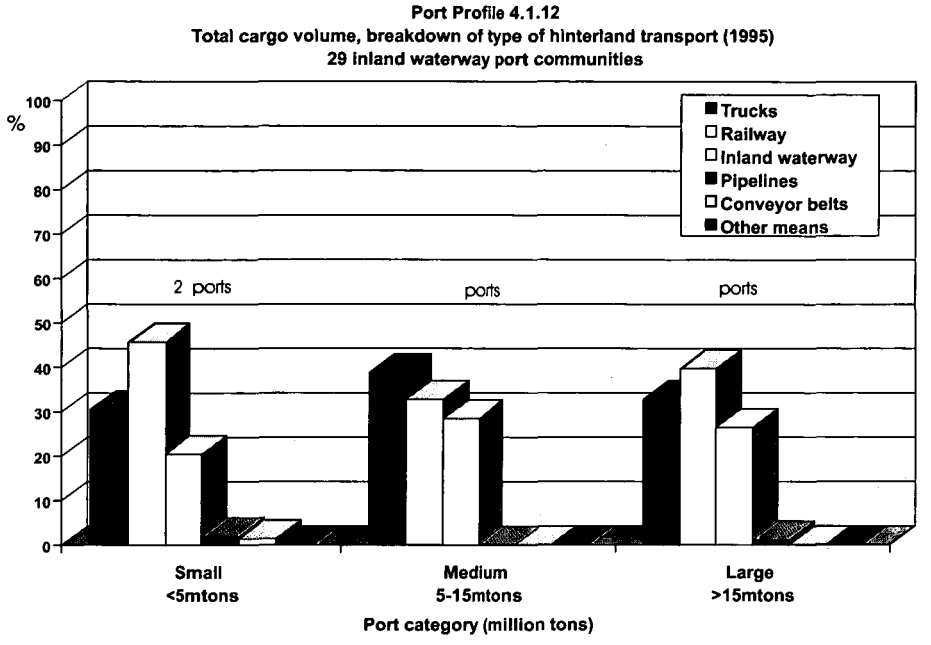


Chart 4.1. 12 - Distribution of the hinterland cargo volume per type of hinterland transport, 29 inland waterway port communities, 1995

S u m m a r y
Breakdown between different types of hinterland transports

Sea ports
The general distribution between the main types of inland/hinterland transport shows that about 65% of the cargo coming from/going to hinterland is transported by road trucks, the railways have about 20% of the transport, followed by inland waterways at 10%. Pipelines (10%) are used in ports where there are large quantities of petroleum products. Notably the share between the different types of hinterland transports is the same independent of the size of the port.

Inland waterway ports
Road trucks carry only 30% of the cargo to/from the inland waterway ports. In small and large inland waterway ports the railways (some of them dedicated industry railways) carry about 40% of the inland cargoes. In the medium size inland waterway ports the hinterland transports are divided evenly between all types (about 30% each). In some inland waterway ports there are pipelines and conveyor belts for discharging and loading of bulk cargoes.

4.1.10 Total cargo volumes, breakdown of export/import, 1995

The objective of this question is to highlight the size of the port and describe the share of export and import cargo volumes.

The ports have been characterised by their share of the total export and import cargo volumes.

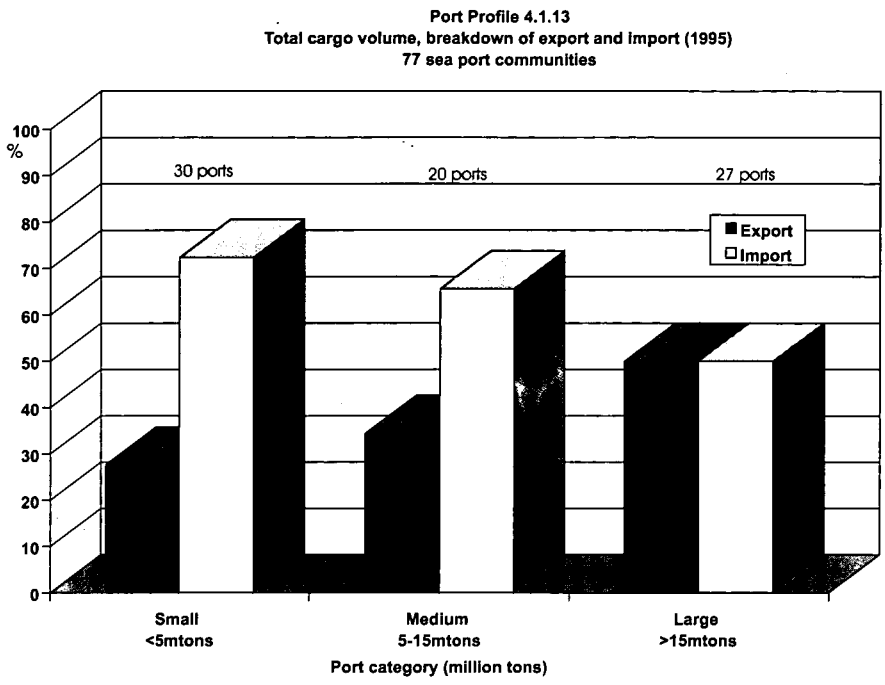


Chart 4.1. 13 - Breakdown of the annual cargo volume between export and import, 77 sea port communities, 1995

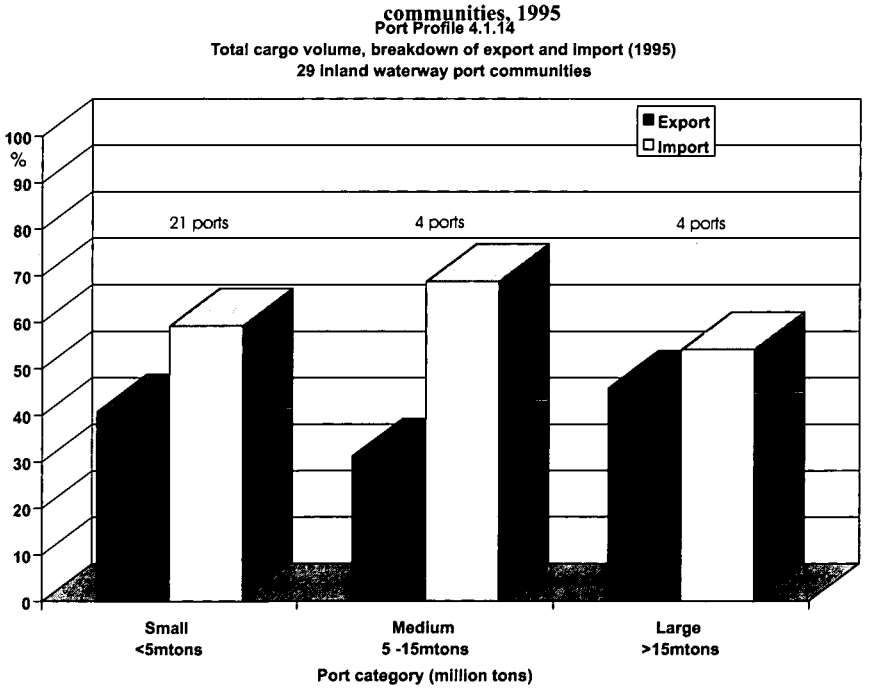


Chart 4.1. 14 - Breakdown of the annual cargo volume between export and import, 29 inland waterway port communities, 1995

The graphical presentations of these analyses of the export and import cargo volumes per commodity groups are shown on the CD-ROM as:

* Chart 4.1. 15 - Export cargo volume per commodity group, 77 sea port communities, 1995
* Chart 4.1. 16 - Import cargo volume per commodity group, 77 sea port communities, 1995
* Chart 4.1. 17 - Export cargo volume per commodity group, 29 inland waterway port communities, 1995
* Chart 4.1. 18 - Import cargo volume per commodity group, 29 inland waterway port communities, 1995

S u m m a r y
Breakdown of export/import cargoes

Sea ports
In our sample imports dominate - in large ports (with a share of 50%); in the medium and small ports (70%). Only in 2 medium size ports is export bigger than import; and only in 7 small ports is export bigger than import.

Inland waterway ports
In the inland waterways ports which are part of a sea port their export volumes dominate. In inland waterway ports which are located on the rivers import dominates in all port categories (60%). However, there are some small inland waterway ports which are mainly export dominated.

4.1.11 Main trading areas, 1995

The objective of this question is to note the geographical areas with which cargo/shipping lines are trading.

The main trading areas both for export and import are ports in:

- *Europe*
- *America*
- *Africa*
- *Asia*

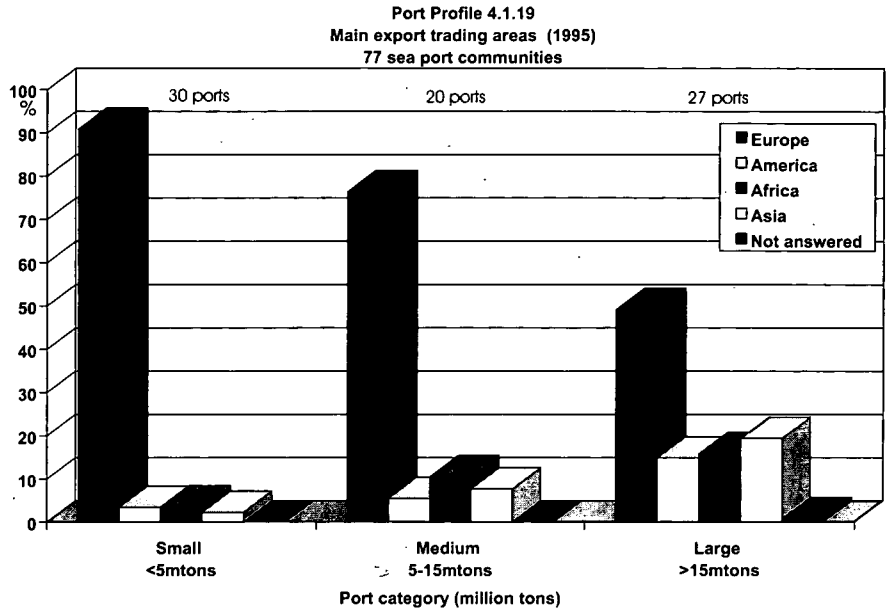


Chart 4.1. 19 - Main export trading areas, 77 sea port communities, 1995

The main trading areas are characterised through the cargo that each port exchanges with its main trading ports; generally this represents over 80% of the total cargo movement of the sample.

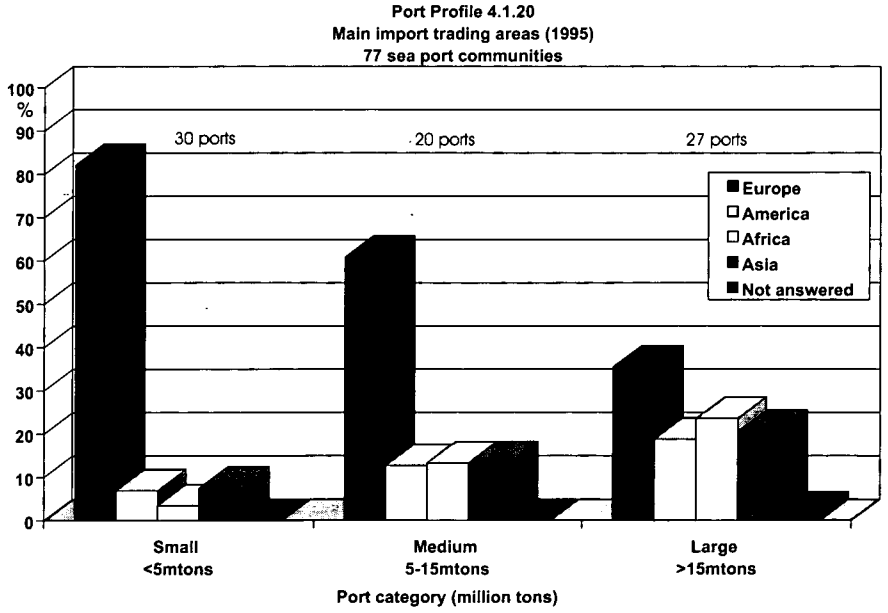


Chart 4.1. 20 - Main import trading areas, 77 sea port communities, 1995

The graphical presentations of the analysis of the main trading areas for the inland waterway port communities are shown on the CD-ROM as:

* Chart 4.1. 21 - Main export trading areas, 29 inland waterway port communities, 1995
* Chart 4.1. 22 - Main import trading areas, 29 inland waterway port communities, 1995

S u m m a r y
Main trading areas

Sea ports; export
The 30 small ports (defined by cargo volume) trade mainly with Europe (in 90% of cases). In the medium port category (20 ports) Europe takes 75% of the cargo volumes. In the large ports Europe takes only 50% of the export volumes - from these ports there is deep-sea cargo trade to America, Asia and Africa (equally at 15% each).

Sea ports; import
In the small ports cargo comes from European ports (80% of cases) while American, African and Asian ports yield about 7% each. In the medium size ports cargo comes from European ports (60%) while American, Asian and African ports yield about 15% each. In the large ports only 35% cargo is imported from Europe, while American, Asian and African ports yield about 20% each.

In all port categories general cargoes dominate the export classification. General cargoes are more dominant in the small ports rather than in the large ports.

In the small ports the imported general cargoes dominate and general cargoes are handled in most of the ports. In the medium size ports the imported cargo volumes are evenly divided between the three commodity types (general, bulk and liquid). For the large ports imported liquid bulk volumes are highest. All European ports handle dry and liquid bulk cargoes.

Inland waterway ports; export
In the small inland waterway ports cargo is exported mainly to European ports (80%), but 15 % of the cargo is exported directly to American ports. In medium and large inland waterway ports cargo is exported mainly to other European ports (90%).

The main exported and commodities in the inland waterway ports are solid dry bulk and general cargoes.

Inland waterway ports; import
In the small inland waterway ports cargo is imported mainly from European ports (85%) although 10% of the cargo is imported directly from American ports. In the medium size inland waterway ports 70% of the imports come from other European ports, with about 20% of imports come from American ports. In large inland waterway ports cargo is imported mainly from other European ports (95%). The main imported commodities are solid dry bulk and liquid bulk cargoes.

4.2 IT Profile of the Port Community Partners

4.2.1 Introduction

One of the main targets of the study was to acquire an overall picture of the current IST situation and the IT profile of the participating ports and port community partners. The classification was elicited with the help of numerous questions proffered within 11 specific groups. The resultant IT profile of port communities and port community partners is described in the following section.

The IT profile analysis is taken across all port community partners: in general this means 77 maritime ports and 29 inland waterway ports. In contrast the analysis for railways and customs authorities are based upon data of 19 participating countries.

Item 1 ***Number of IT staff members***
The number of IT staff members of each port community partner describes the IT resources available for daily IT operations and IT development. The analysis is presented at a summary level for all partners.

Item 2 ***Use of software applications***
The port community partners were asked to comment on 26 different software applications. These applications are regarded as the functional core in developing the telematics services of the port community partners. The applications are listed in a separate table to give an overall picture of the variety of software applications in port communities and within a single partner group. The analysis is presented for each partner since the use of software may explain the current status of telematics and telematics links in ports.

Item 3 ***Software supplier***
Software supplier has been analysed against two alternatives: software developed by own staff or purchased from an external supplier. The analysis is presented at a summary level for all partners.

Item 4 ***Type of operating systems***
The most commonly used operating systems have been analysed. The analysis is presented at a summary level for all partners.

Item 5 ***Currently outsourced system operations***
The number of system operations which are outsourced have been analysed. They are presented for each partner.

Item 6 ***Maintenance and support of the software applications***
Two alternatives have been analysed: Maintenance by own staff or by an external service company. The analysis is presented at a summary level for all partners.

Item 7 ***Currently outsourced maintenance and software operations***
The number of currently outsourced maintenance and software operations have been analysed. The analysis is presented for each partner.

Item 8 ***Problems with old software and old hardware***
The influence of old software and hardware on the current IT status of the ports.
The analyses are presented at a summary level for all partners.

Item 9 ***Use of data communication networks***
The means of data communication and the networks used in the daily operation of the ports. The analyses are presented at a summary level for all partners.

Item 10 ***Problem areas in telecommunication infrastructure***
The situation of telecommunication infrastructure with cost elements in the port communities. The analysis is presented at a summary level for all partners.

Item 11 ***Current use of Internet/Intranet***
The current use of Internet/Intranet. The analysis is presented at a summary level for all partners.

4.2.2 Number of IT staff members

The number of IT staff members of the port community partner was regarded as one of the main indicators in describing the IST situation of the ports.

In order to describe the IT resources, all port community partners in the 106 ports were asked to state the number of persons working in the IT department on the daily operations of the applications, software development, EDI and telecommunications. The results are presented at a summary level for all the partners.

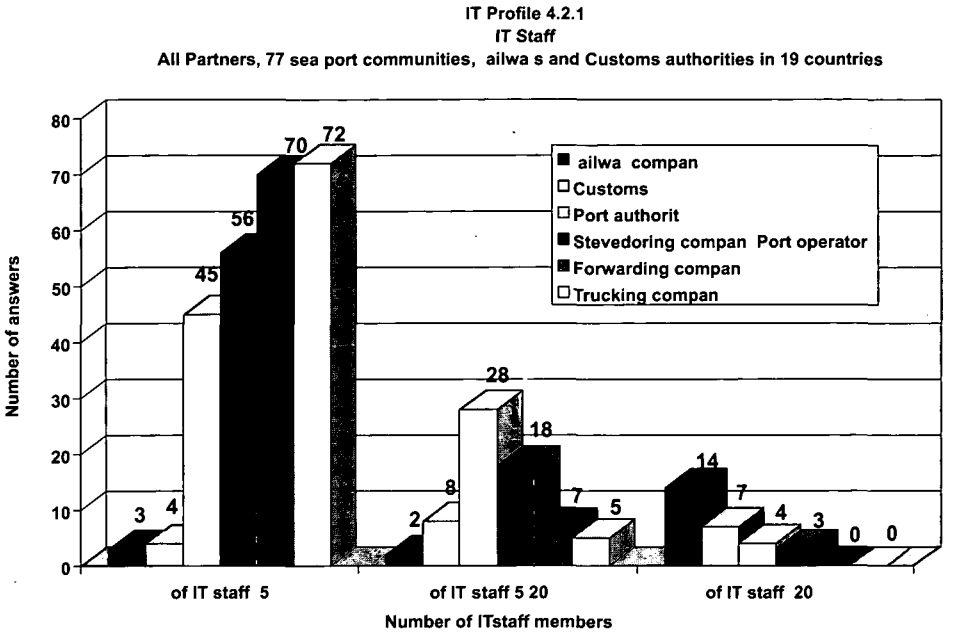


Chart 4.2. 1 - Number of IT staff members of all partners in 77 sea port communities, Railways and Customs in 19 countries

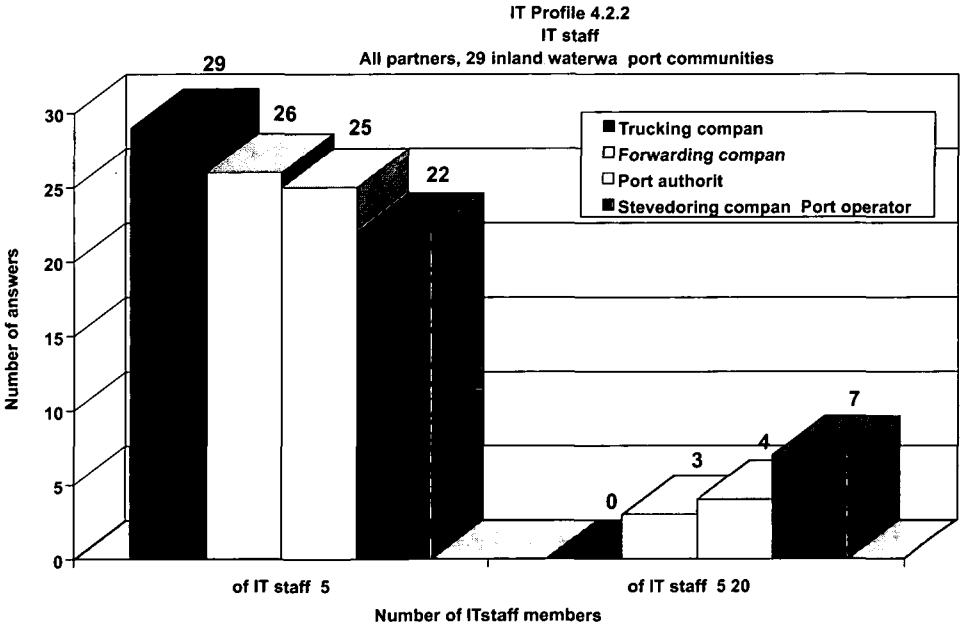


Chart 4.2. 2 - Number of IT staff members of all partners, 29 inland waterway port communities

The majority of the port community partners in sea ports have less than 5 persons in their IT staff. Most railway companies and some customs authorities have more than 20 IT persons, while very few port operators/stevedoring companies have more than 20 persons in their IT staff.

Most of the port community partners in inland waterway ports have less than 5 persons in the IT staff, none of them have more than 20 persons.

4.2.3 Use of software applications

The participating ports and their partners were questioned about their use of 26 different software applications. Some applications, like invoicing, were questioned separately from each partner thus making the total number of applications 26. These applications are the full spectrum of software applications to be expected from the partners as a core for the telematics services of the port community partners.

The specified applications are listed below:

	Application	Port Authorit	Port Operator Stevedore	Forwarding Company	Trucking Company	Railway Company	Customs Authority
1	B/L, Freight Waybill			√	√	√	
2	Berth Allocation	√					
3	Cargo Tracing				√		
4	Container Yard Man.		√				
5	Customs Invoicing						√
6	Damage Follow-up		√				
7	Dangerous goods	√	√				
8	Exp/Imp Clearance		√	√			√
9	Freight Terminal		√				
10	Invoicing	√	√	√	√	√	
11	Manifest						√
12	Notice of Arr/Dept			√			
13	Production Planning		√				
14	Statistics	√					
15	Wagon Tracing					√	
16	Vessel Declaration						
17	VTS	√					√
	Total 26 applications	5	7	4	3	3	4

Chart 4.2. 3 - Use of software applications

Three different answers were noted:

- The number of software applications **in use**
- The number of software applications **not in use**
- The number of **no replies**

The distribution of use of software applications for each port community partner in 77 sea ports and 29 inland waterway ports is shown below.

4.2.3.1 Port Authorities

The use of 5 specified software applications were asked from the port authorities:

- Invoicing software
- Statistics software
- Dangerous goods software
- Berth Allocation software
- VTS software

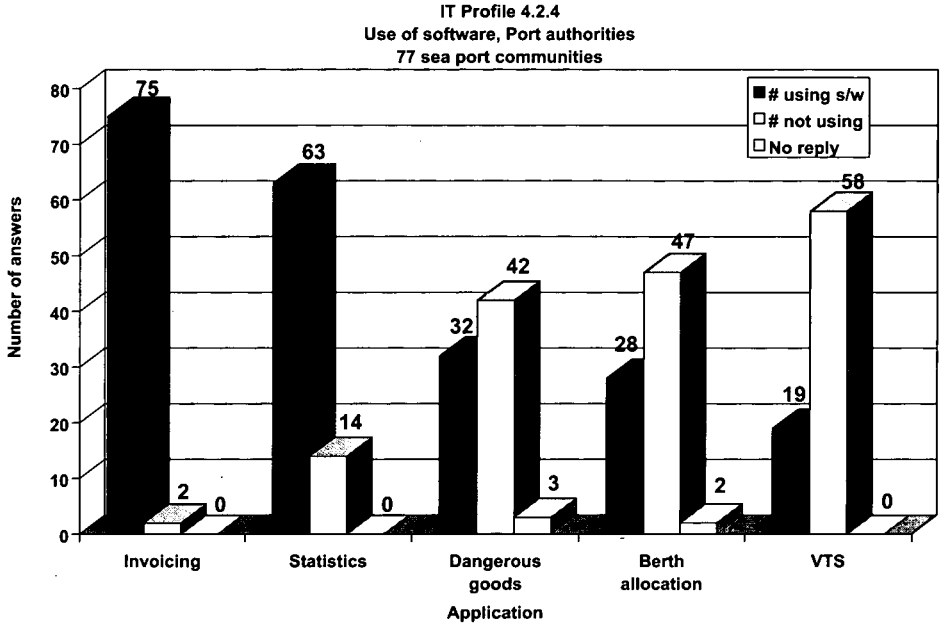


Chart 4.2. 4 - Use of software, Port authorities, 77 sea port communities

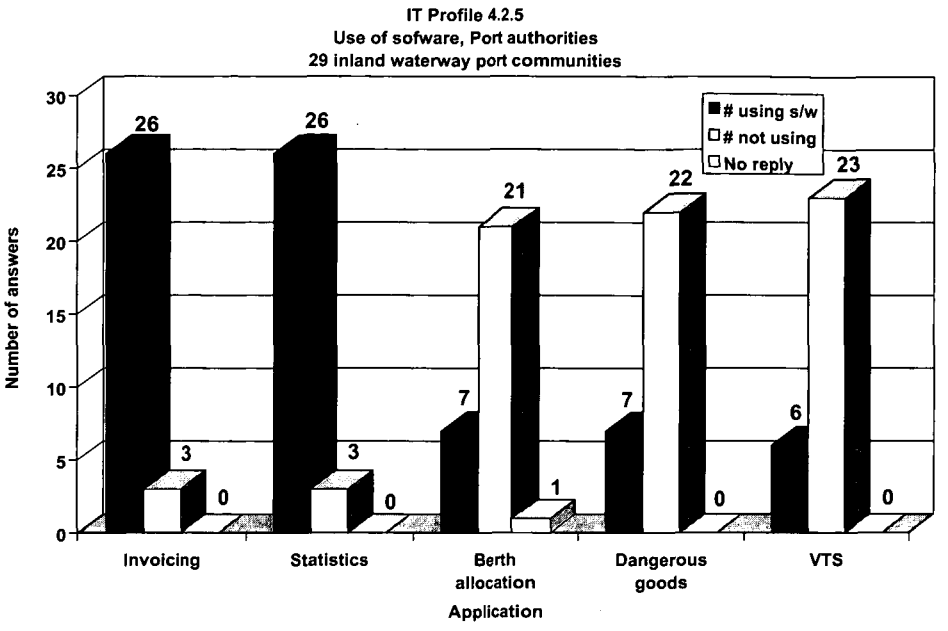


Chart 4.2. 5 - Use of software, Port authorities, 29 inland waterway port communities

Invoicing and statistics software are the most commonly used applications of the port authorities.

Further analysis including correlations (by number of sailings per month), has been undertaken only for the sea ports. The correlation analysis charts can been seen on the CD-ROM as:

* Chart 4.2. 6 - Use of specified applications, Number of sailings per month, Port authorities, 77 sea port communities

The berth allocation software, VTS software and dangerous goods software are used mainly in ports which belong to the large sea port category (as defined by number of sailings per month).

4.2.3.2 Port operators/stevedoring companies

The use of seven different software applications were asked of the port operators/stevedoring companies:

- Invoicing software
- Freight Terminal software
- Container Yard Management software
- Production Planning software
- Export/Import Clearance software
- Dangerous goods software
- Damage Follow-up software

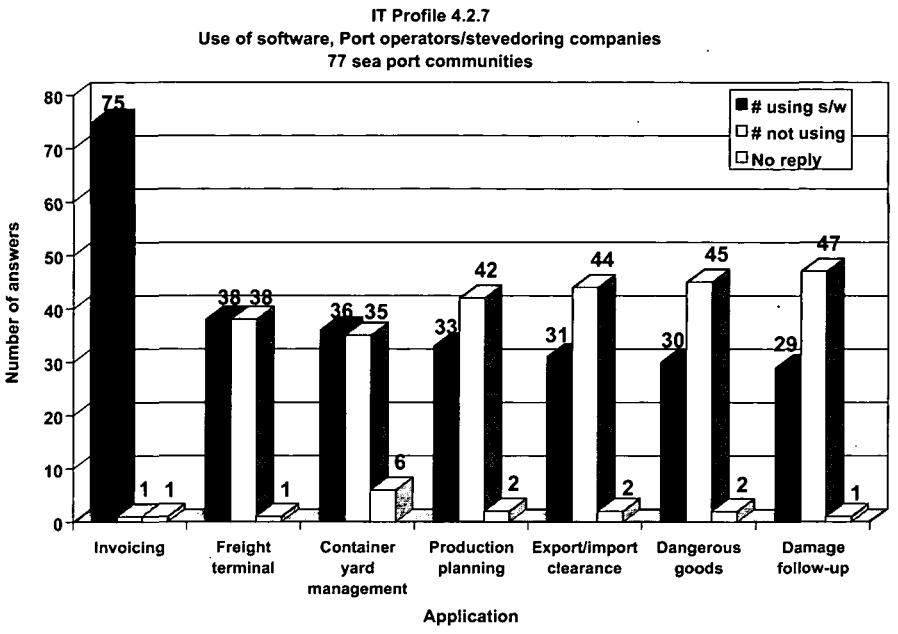


Chart 4.2. 7 - Use of software, Port operators/stevedoring companies, 77 sea port communities

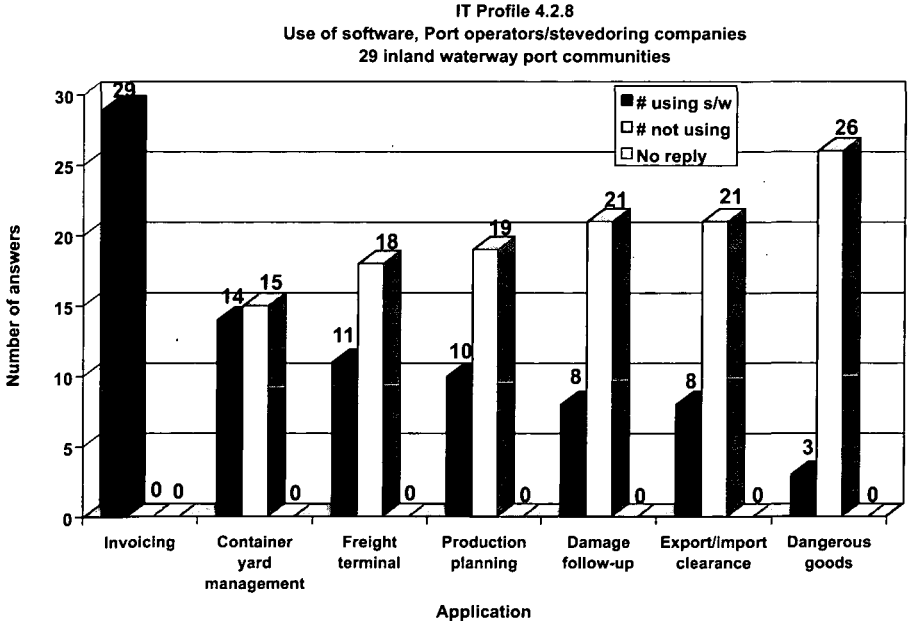


Chart 4.2. 8 - Use of software, Port operators/stevedoring companies, 29 inland waterway port communities

The port operators/stevedoring companies in the inland waterway ports have about 10% less software applications in use than in the sea ports. The biggest difference is in the use of dangerous goods management software: 30 port operators/stevedoring companies in sea ports have software for dangerous goods management against only 3 port operators/stevedoring companies in inland waterway ports.

A more detailed analysis with correlations, based on the total cargo volume as the correlation parameter, has been done but only for the 77 sea ports and is presented on the CD-ROM. We note container yard management software is mainly used in the large ports. Export/import clearance and dangerous goods management software applications are commonly used in all three port categories (by size - total cargo volume).

* Chart 4.2. 9 - Use of specified applications, Total cargo volume, Port operators/stevedoring Companies, 77 sea port communities

4.2.3.3 Forwarding companies

The use of 4 different types of software applications was asked of the forwarding companies:

- Invoicing software
- Bill of Lading, freight waybill software
- Export/Import Clearance software
- Notice of Arrival/Departure software

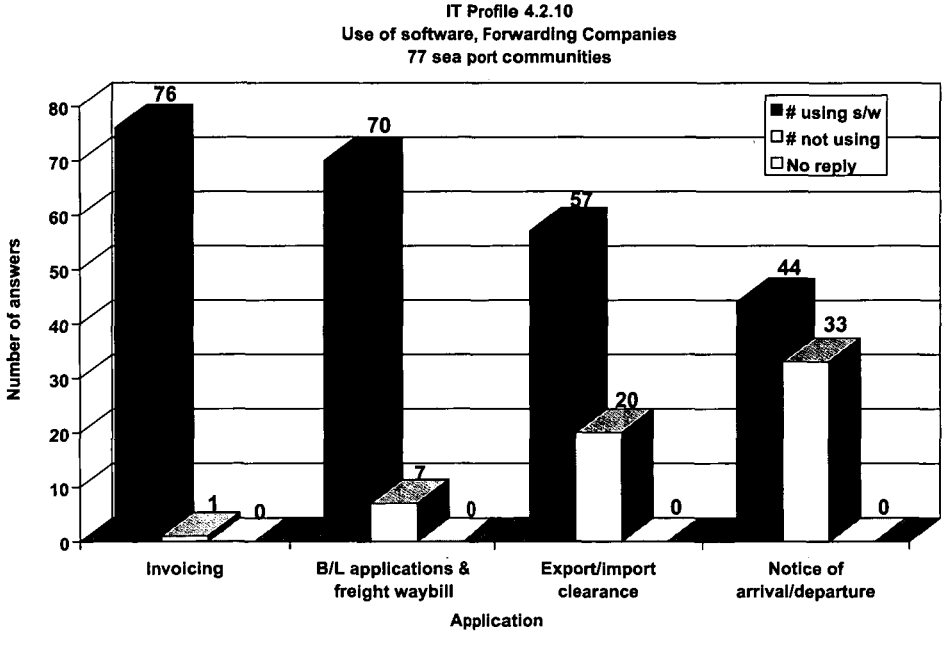


Chart 4.2. 10 - Use of software, Forwarding companies, 77 sea port communities

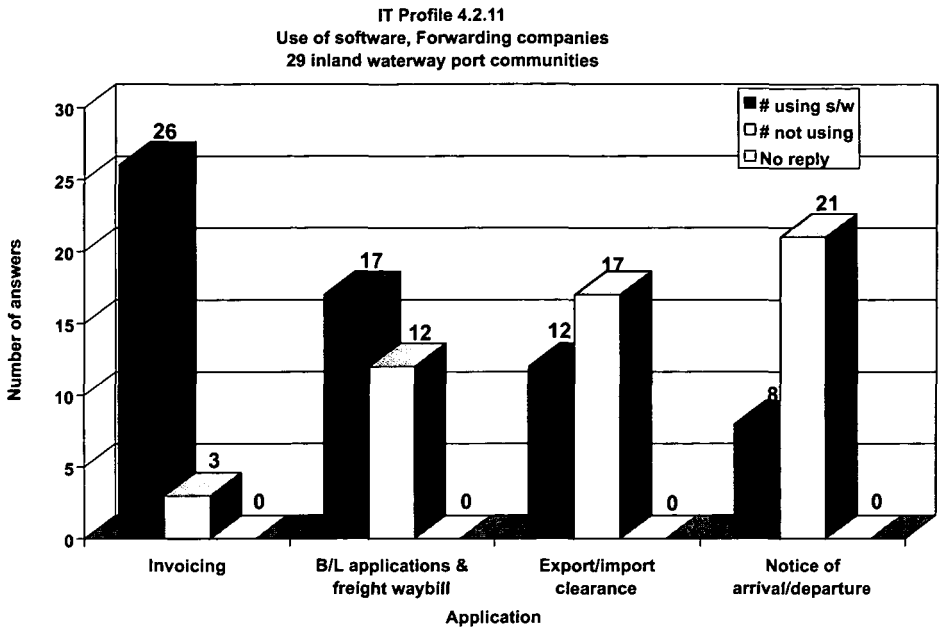


Chart 4.2. 11 - Use of software, Forwarding companies, 29 inland waterway port communities

The most commonly used applications of the forwarding companies in all port communities are invoicing, bill of lading and freight waybills, and export/import clearance applications. There is little use of software applications for managing the arrival and departure notices in inland waterway port communities but in sea port communities they are used by more than half of the forwarding companies.

The correlation analysis shows that bill of lading and freight waybill, export/import clearance applications and the software applications for managing the arrival and departure notices are used by forwarding companies in all port categories of the sea ports (by total annual cargo volume).

The correlation analysis charts are shown on the CD-ROM as:

* Chart 4.2. 12 - Use of specified applications, Total cargo volume, Forwarding companies, 77 sea port communities

4.2.3.4 Trucking companies

The use of 3 different types of software applications was elicited from the trucking companies:

- Invoicing software
- Freight Waybill software
- Cargo Tracing software

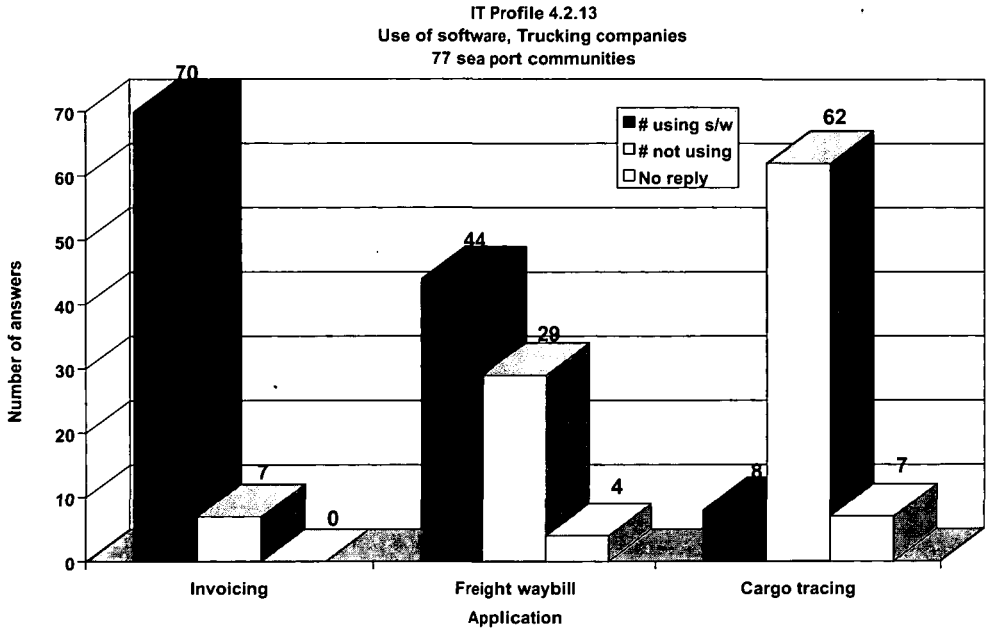


Chart 4.2. 13 - Use of software, Trucking companies, 77 sea port communities

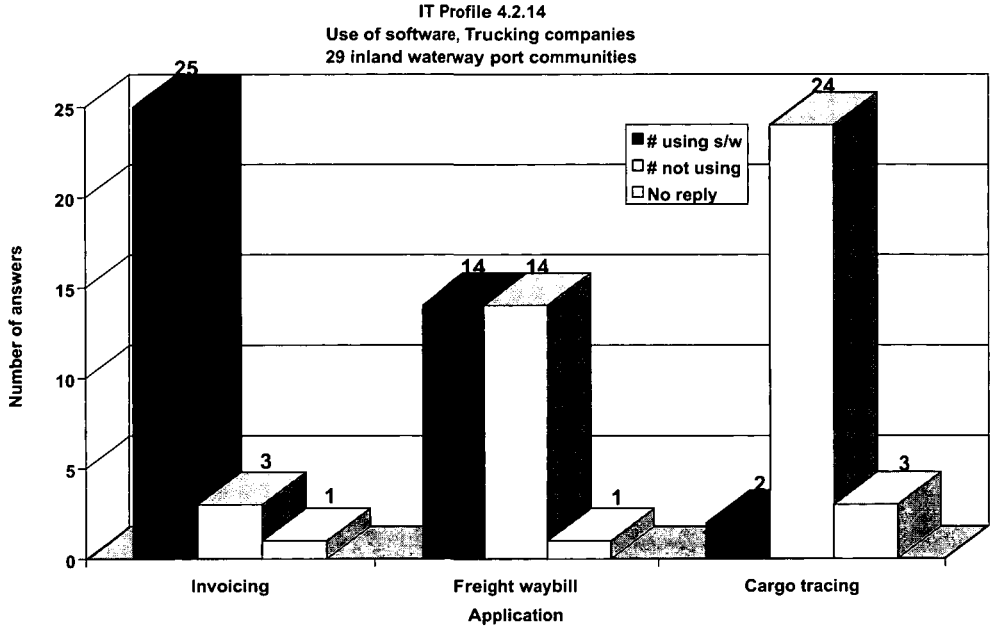


Chart 4.2. 14 - Use of software, Trucking companies, 29 inland waterway port communities

The most common applications of trucking companies in all port communties are the invoicing and freight waybill applications. Only a few trucking companies have tracking and tracing applications.

A detailed analysis including correlations (total cargo volume as correlation parameter) has been done only for the sea ports and is shown on the CD-ROM. Freight waybill applications are used in trucking companies of all port categories. Cargo tracing application is mainly used by trucking companies in large ports.

* Chart 4.2. 15 - Use of specified applications, Total cargo volume, Trucking Companies, 77 sea port communities

4.2.3.5 Railway companies

The use of three different types of software applications have been asked of the railway companies:

- Freight waybill software
- Invoicing software
- Wagon tracing software

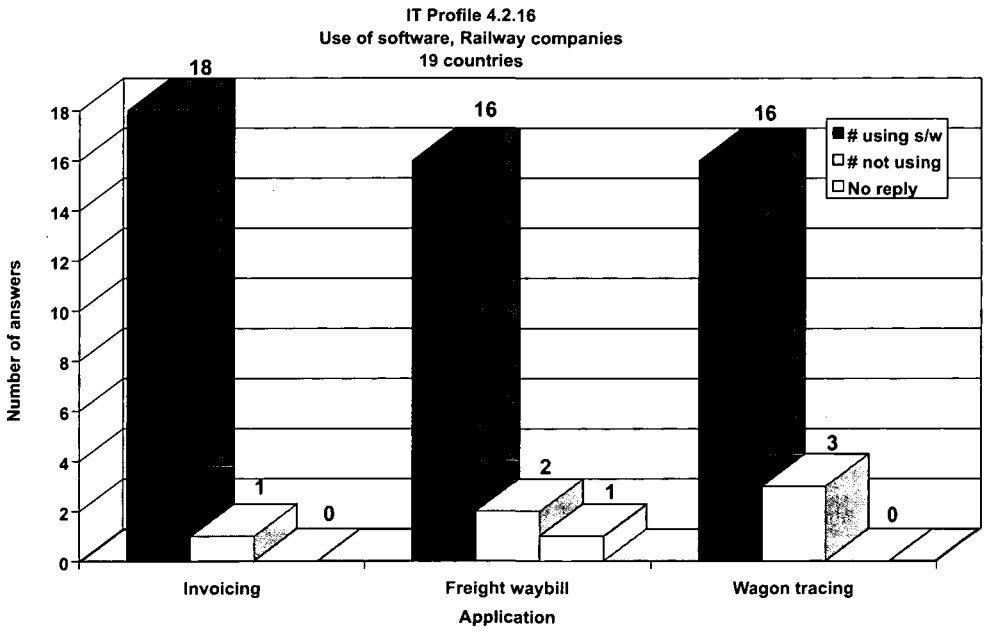


Chart 4.2. 16 - Use of software, Railway companies in 19 countries

There are only two railway companies in this study which do not use the specified software applications.

4.2.3.6 Customs Authorities

Two different software applications were asked of the Customs Authorities:

- Export/Import clearance and customs invoicing software
- Manifest and vessel declaration software

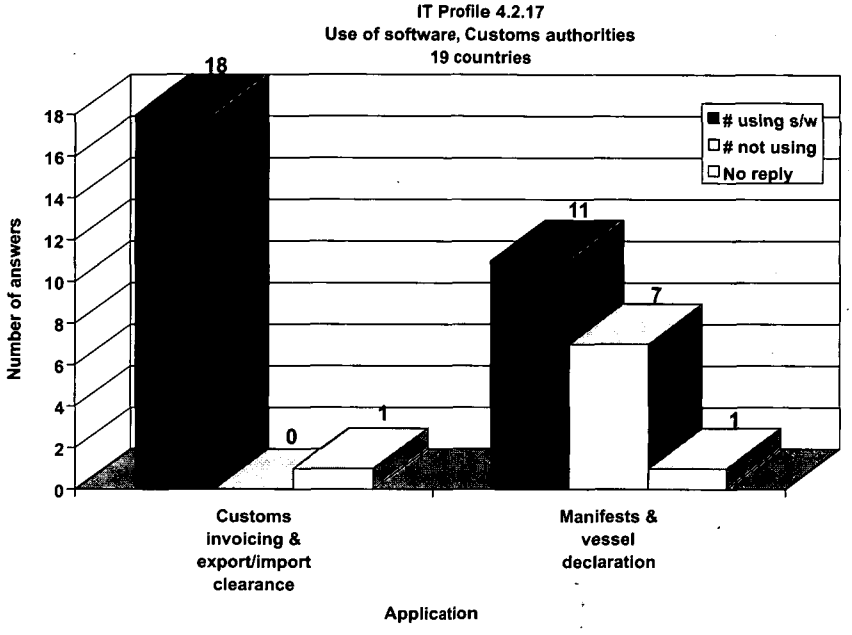


Chart 4.2. 17 - Use of software, Customs authorities in 19 countries

Most of the customs authorities have software application for export and import clearance and customs invoicing, and only half of the customs authorities have software application for manifests and vessel declarations.

4.2.4 Software Supplier

To further define the use of software in the port communities, they were asked whether the software applications they were using were developed by own IT staff, or purchased from an external supplier.

The distribution of external software supplier and own IT staff for all partners in 77 sea ports and 29 inland waterway ports is shown in the following charts.

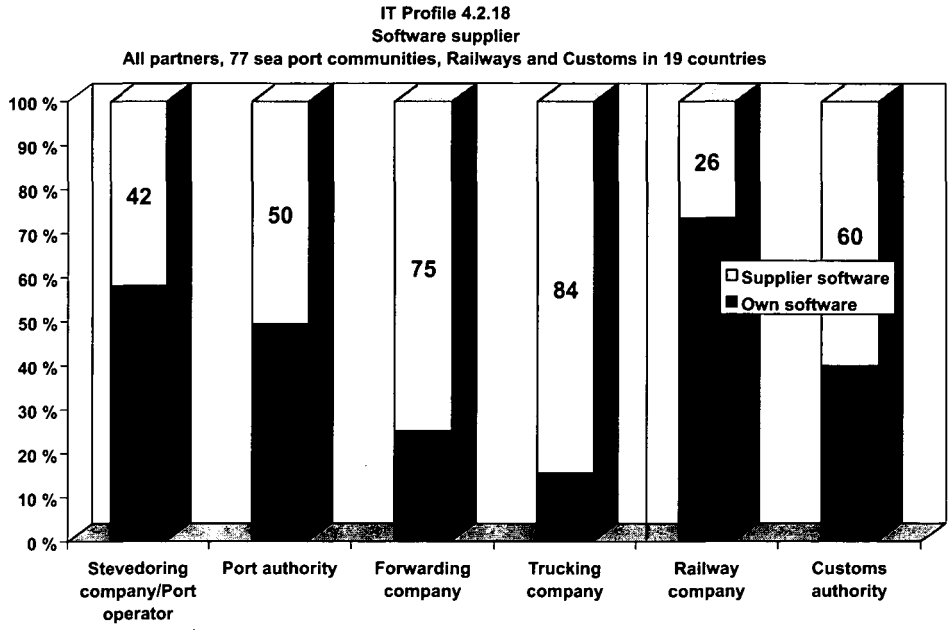


Chart 4.2. 18 - Software supplier, All partners , 77 sea port communities, Railways and Customs in 19 countries

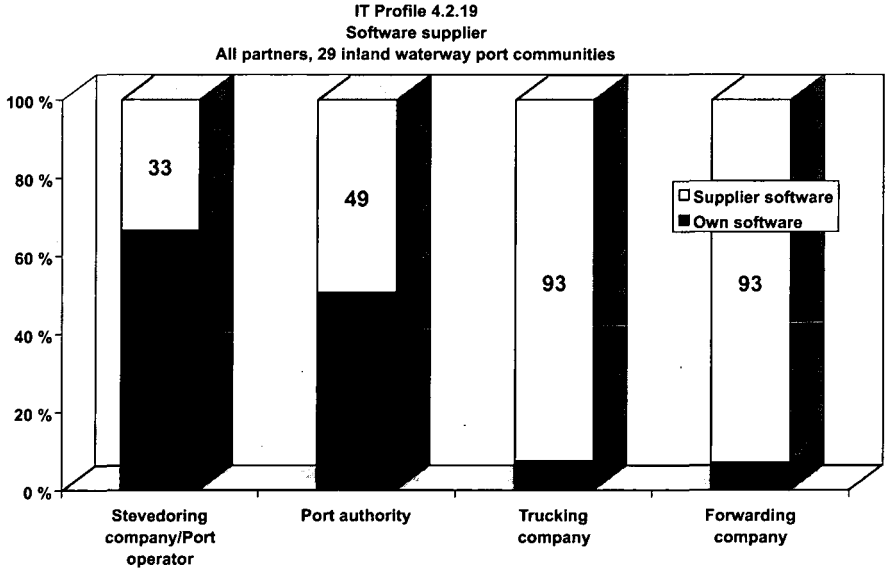


Chart 4.2. 19 - Software supplier, All partners, 29 inland waterway port communities

Half of the port community partners seem to develop their own software by themselves; in contrast, the forwarding and trucking companies appear to purchase their software from external suppliers.

4.2.5 Type of platforms and operating systems

This question asks about the current hardware platforms and system environments in the port communities. The following 'operating' systems were highlighted: mainframe, middle size, client/servers, UNIX, PC Windows, PC DOS.

It is to be noted that the port community partners may have several platforms and operating systems in use. The results are shown as percentile breakdown between the different alternatives.

The replies are summarised as follows:

- Mainframes (MF) - centralised IT solution
- Client/Server (C/S) - one technology framework
- Stand alone (SA) - stand alone PC solution

Here we show only the result across all partners.

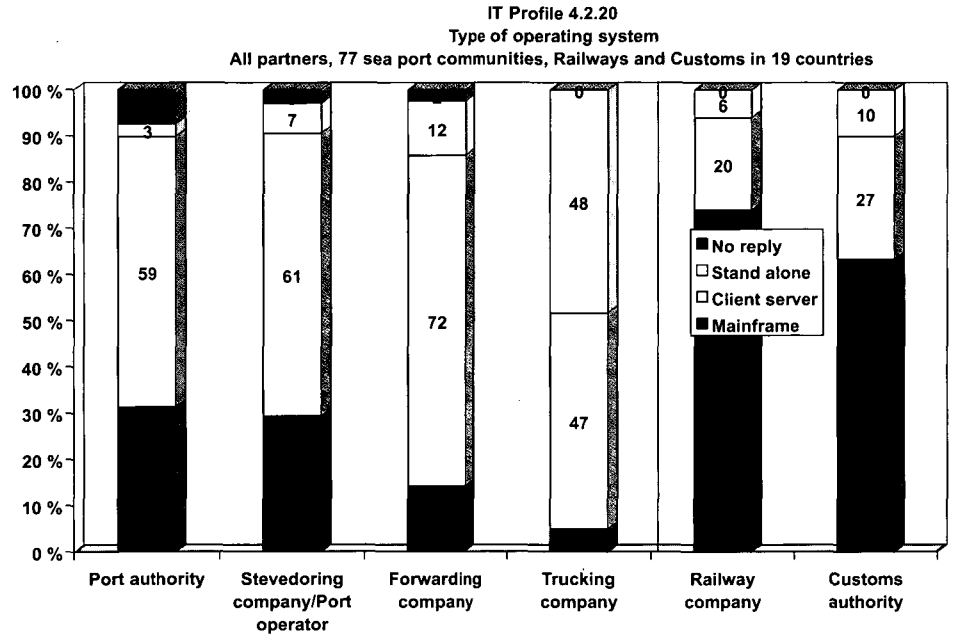


Chart 4.2. 20 - Type of operating system, All Partners, 77 sea port communities, Railways and Customs in 19 countries

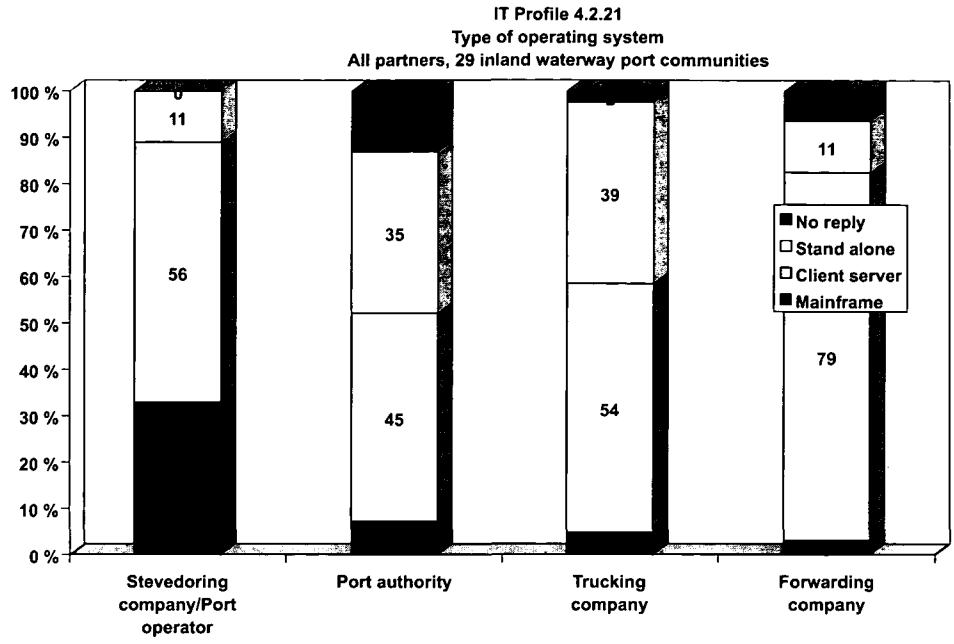


Chart 4.2. 21 - Type of operating system, All partners, 29 inland waterway port communities

Mainframe systems are used by all port community partners (sea ports and inland waterway ports) except for forwarding and trucking companies which use them very little. Client/server technology is used by all port community partners. Railway companies use client/servers to a lower extent.

The analysis was done at the partner level - the specific charts for each partner can be seen on the CD-ROM as:

* Chart 4.2. 22 - Type of operating system, Port authorities, 77 sea port communities
* Chart 4.2. 23 - Type of operating system, Port operators/stevedoring companies, 77 sea port communities
* Chart 4.2. 24 - Type of operating system, Forwarding companies, 77 sea port communities
* Chart 4.2. 25 - Type of operating system, Trucking companies, 77 sea port communities
* Chart 4.2. 26 - Type of operating system, Railway companies, 19 countries
* Chart 4.2. 27 - Type of operating system, Customs authorities, 19 countries
* Chart 4.2. 28 - Type of operating system, Port authorities, 29 inland waterway port communities
* Chart 4.2. 29 - Type of operating system, Port operator/stevedoring companies, 29 inland waterway port communities
* Chart 4.2. 30 - Type of operating system, Forwarding companies, 29 inland waterway port communities
* Chart 4.2. 31 - Type of operating system, Trucking companies, 29 inland waterway port communities

4.2.6 Currently outsourced system operations

The objective of this question was to highlight the extent to which outsourcing of system operations was undertaken by the port community partners. All partners in 77 sea ports and 29 inland waterway ports were asked if their system operations were currently outsourced.

The result for the outsourcing analysis is as follows:

First bar	Number of using software
Second bar	Number of which are outsourced
Third bar	Number of which are not outsourced
Fourth bar	No replies

The analysis was done for all port community partners who were in fact using the specified software applications (77 sea ports and 29 inland waterway ports). Of course, outsourcing cannot be done on non-use.

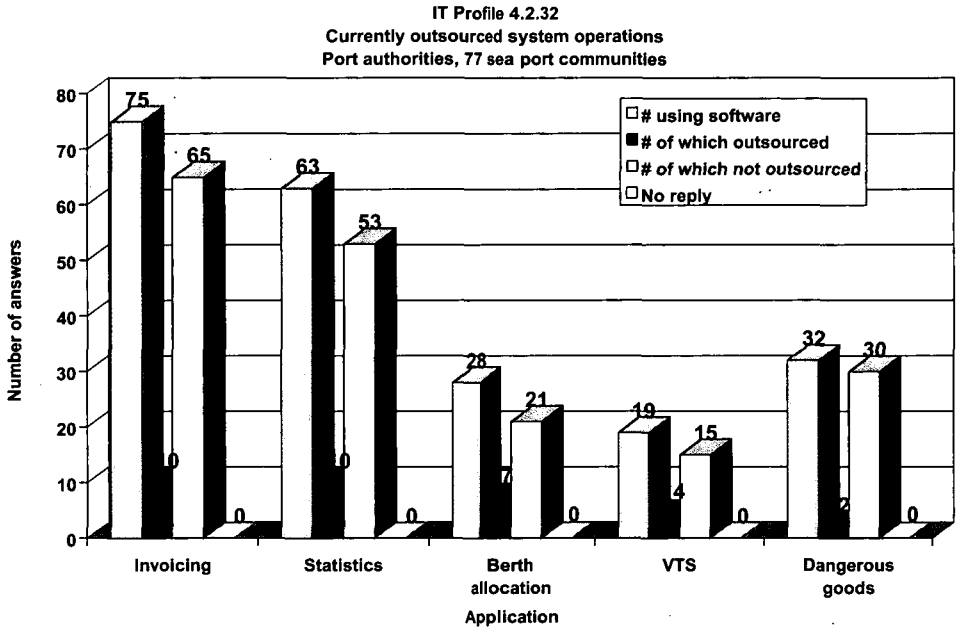


Chart 4.2. 32 - Currently outsourced system operations, Port authorities, 77 sea port communities

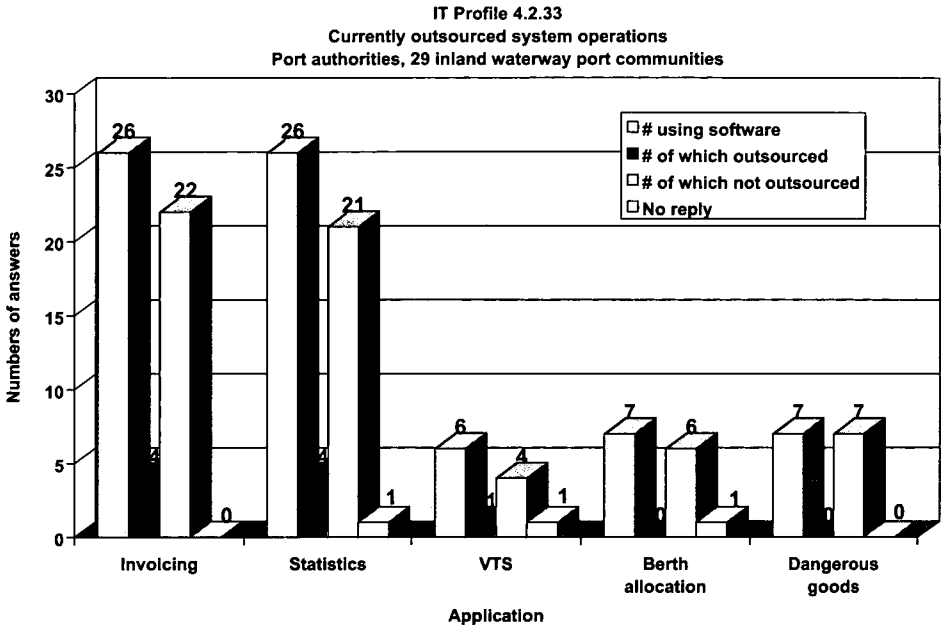


Chart 4.2. 33 - Currently outsourced system operations, Port authorities, 29 inland waterway port communities

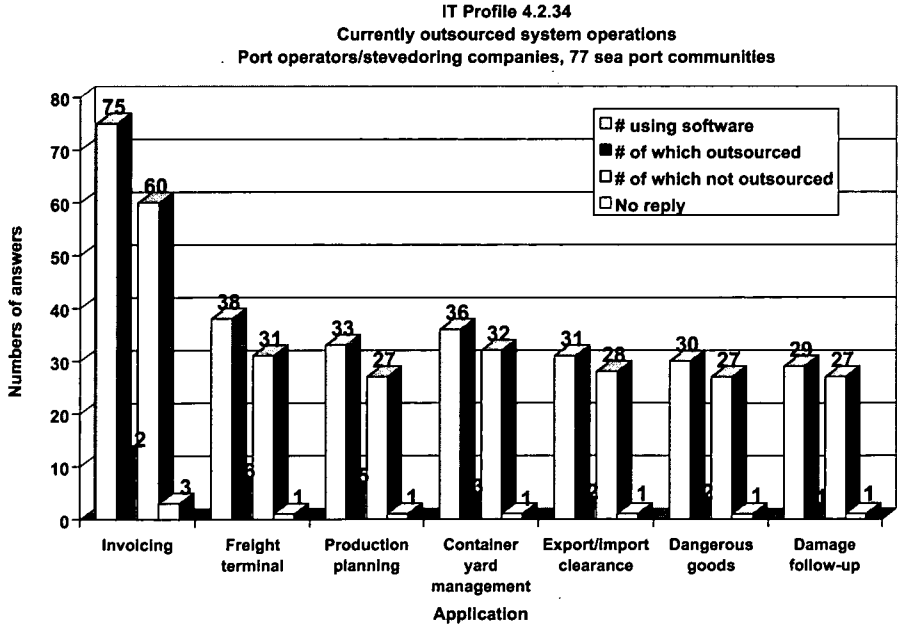


Chart 4.2. 34 - Currently outsourced system operations, Port operators/stevedoring companies, 77 sea port communities

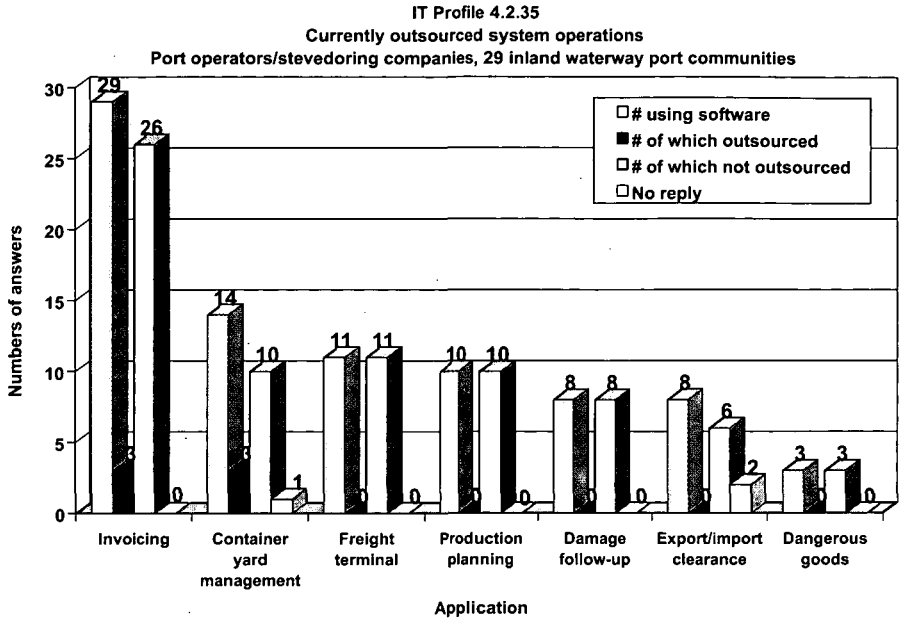


Chart 4.2. 35 - Currently outsourced system operations, Port operators/stevedoring companies, 29 inland waterway port communities

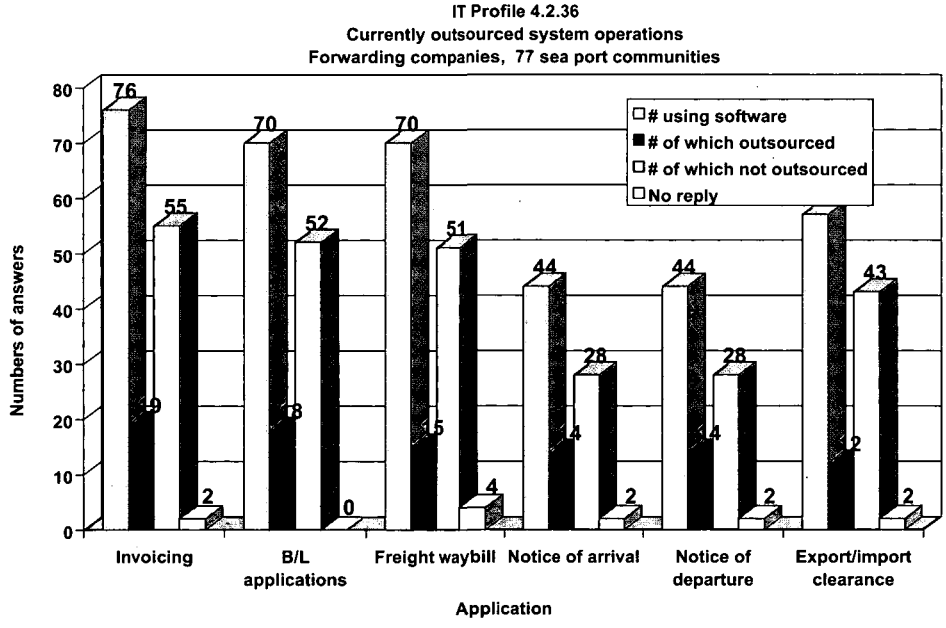


Chart 4.2. 36 - Currently outsourced system operations, Forwarding companies, 77 sea port communities

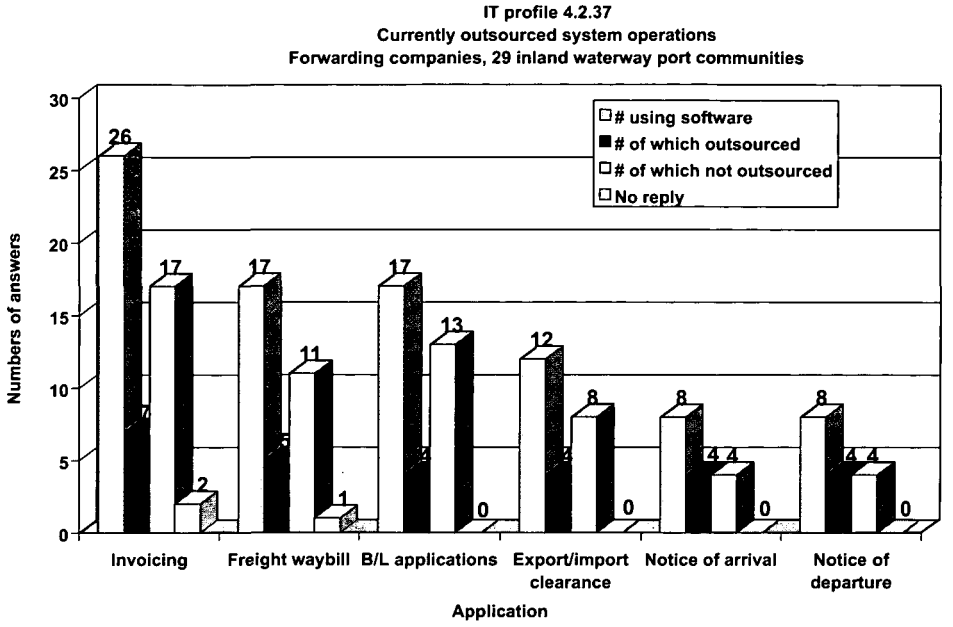


Chart 4.2. 37 - Currently outsourced system operations, Forwarding companies, 29 inland waterway port communities

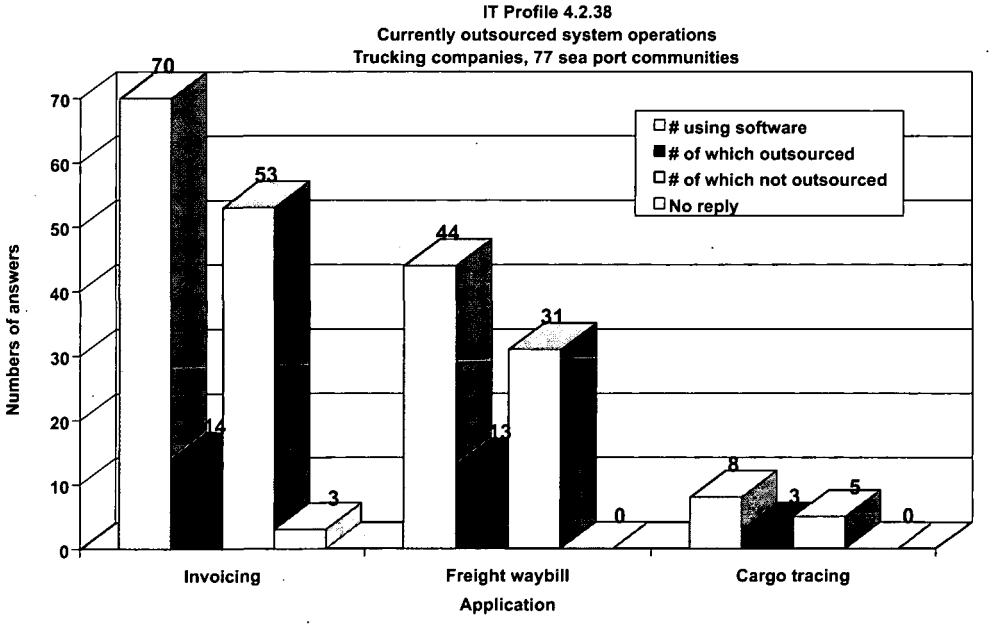


Chart 4.2. 38 - Currently outsourced system operations, Trucking companies, 77 sea port communities

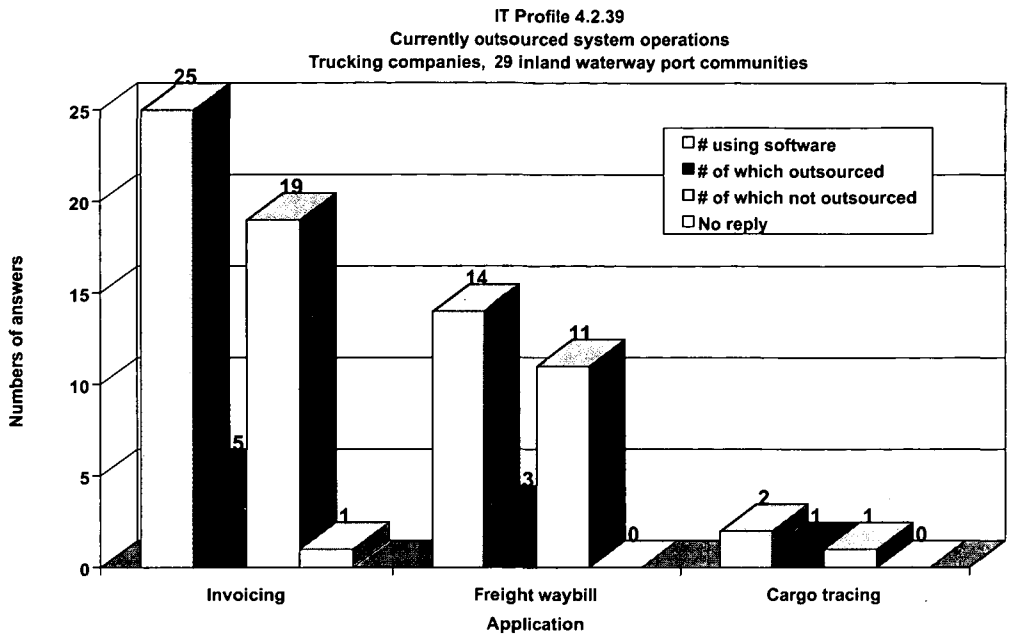


Chart 4.2. 39 - Currently outsourced system operations, Trucking companies, 29 inland waterway port communities

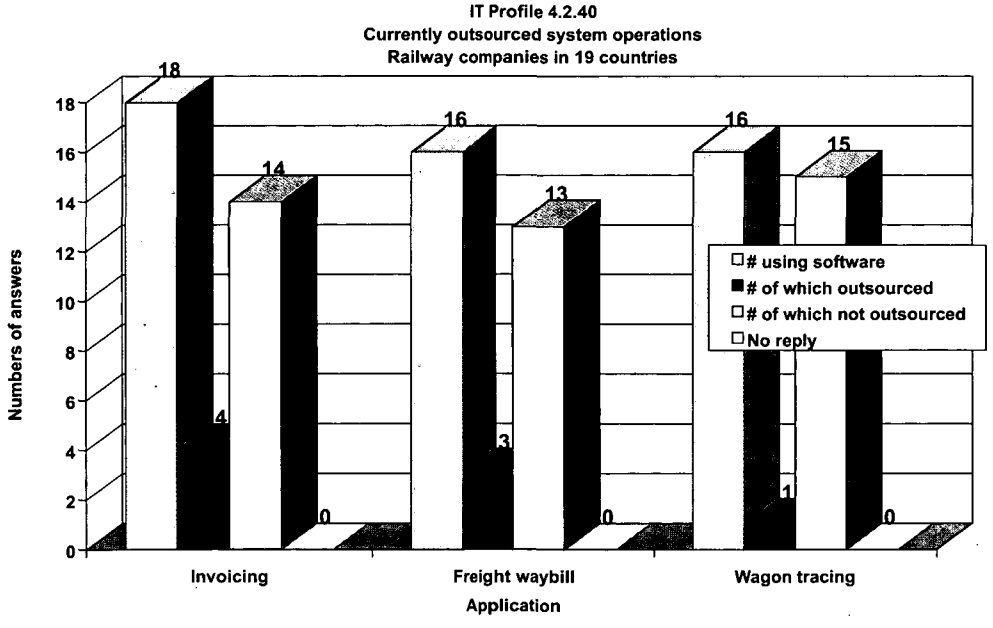


Chart 4.2. 40 - Currently outsourced system operations, Railway companies in 19 countries

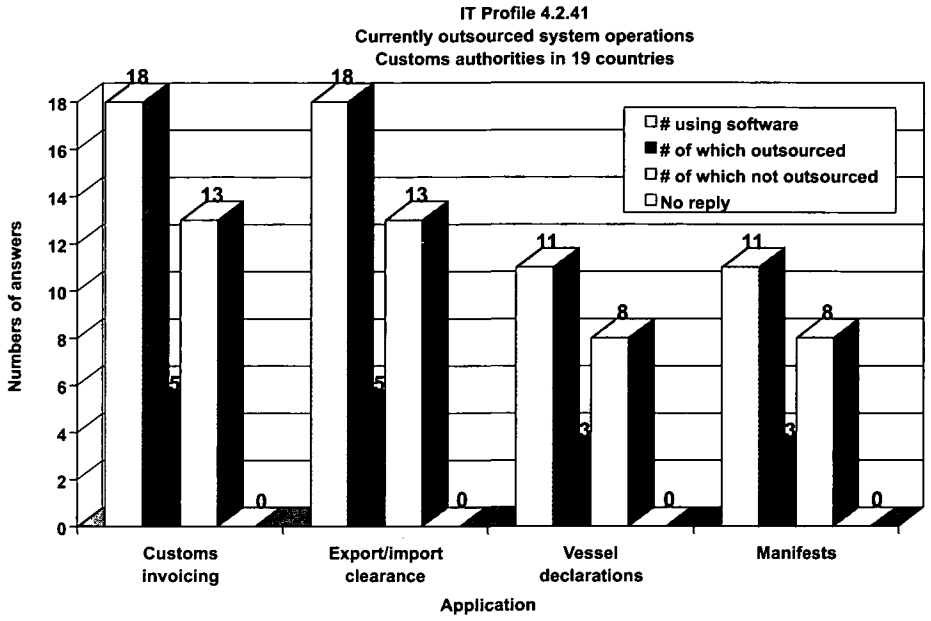


Chart 4.2. 41 - Currently outsourced system operations, Customs authorities in 19 countries

The outsourcing of system operations is not commonly used by the port community partners - it is noted that the forwarding and trucking companies are the biggest users of outsourced system operations. Otherwise outsourcing is mainly used for invoicing applications.

4.2.7 Maintenance and support of the software applications

The maintenance and support of the software applications were asked over all 26 specified applications. The results are shown as the percentile breakdown between external supplier and own IT staff at partner level.

A summary of the results for all of the partners both in 77 sea ports and 29 inland waterway ports concerning the maintenance and support of the software applications is shown below:

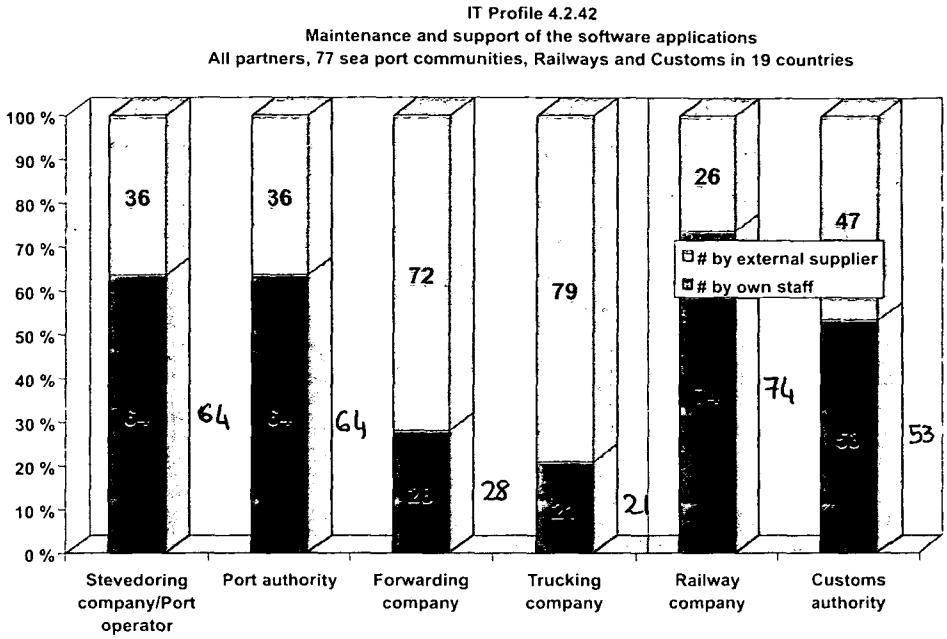


Chart 4.2. 42 - Maintenance and support of the software applications, All partners, 77 sea port communities, Railways and Customs in 19 countries

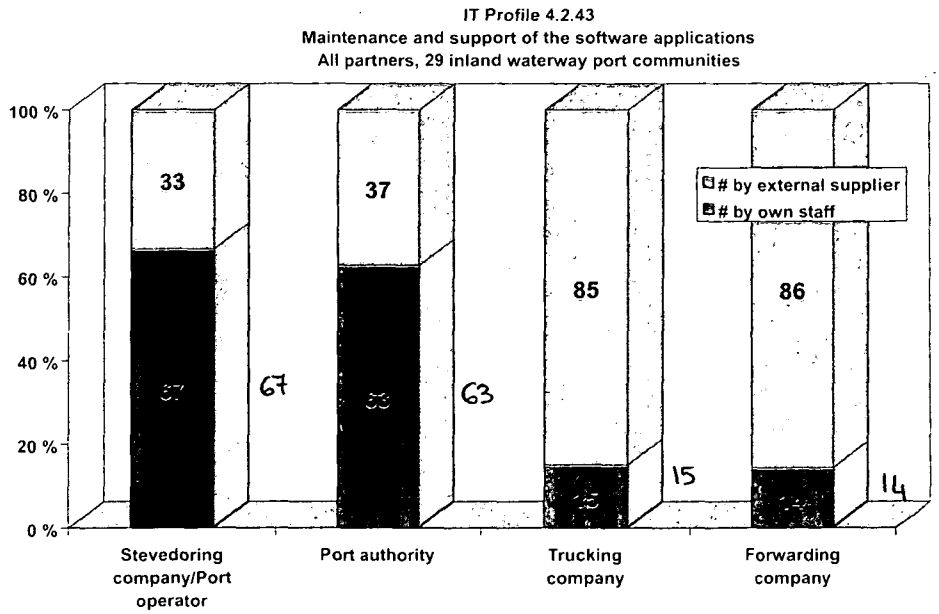


Chart 4.2. 43 - Maintenance and support of the software applications, All partners, 29 inland waterway port communities

The maintenance and support of the software applications of the port community partners is generally done by their own IT staff, except in the trucking and forwarding companies where the maintenance and support of the software applications are from the external suppliers.

4.2.8 Currently outsourced maintenance and software operations

There was a presumption that the level of IT resources may have an influence on outsourcing, so the partners were asked about the current situation of outsourcing their maintenance and software operations.

Four different answers are reported for each partner. Note - only if they were using the specified software could they respond on whether or not they were outsourcing.

- Number using software applications
- Number of maintenance and software operations outsourced
- Number of maintenance and software operations not outsourced
- No replies

4.2.8.1 Port Authorities

The port authorities were asked about outsourcing of the maintenance and software operations for the 5 specified applications (as noted earlier).

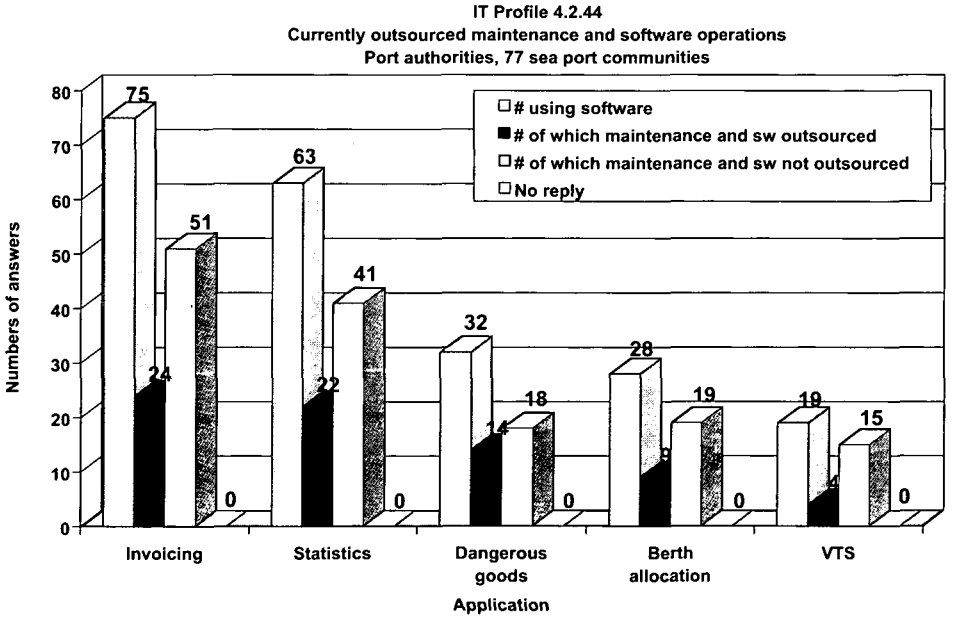


Chart 4.2. 44 - Currently outsourced maintenance and software operations, Port authorities, 77 sea port communities

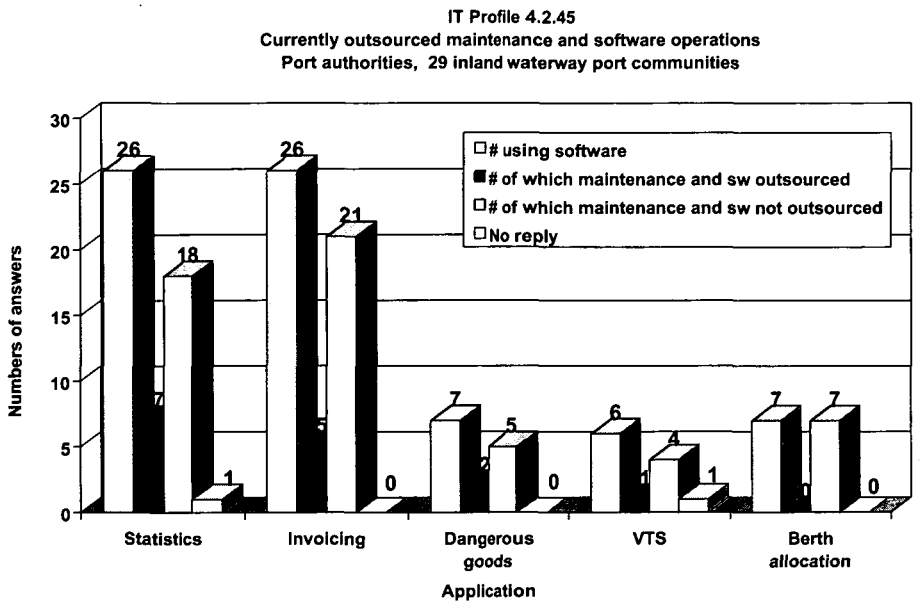


Chart 4.2. 45 - Currently outsourced maintenance and software operations, Port authorities, 29 inland waterway port communities

Maintenance and software operations of statistics and invoicing applications of the port authorities in both sea and inland waterway ports are the most often outsourced.

In the correlation analysis (by total tons and only for sea ports) which are shown on CD-ROM, we find that outsourcing of maintenance and software operations seems to increase as the size of the port decreases (20% in large ports, 31% in medium ports and 55% in small ports).

* Chart 4.2. 46 - Currently outsourced maintenance and software operations, Total cargo volume, Port authorities, 77 sea port communities

4.2.8.2 Port Operators/Stevedoring companies

Port operators/stevedoring companies were asked about outsourcing of the maintenance and software operations of their 7 different applications.

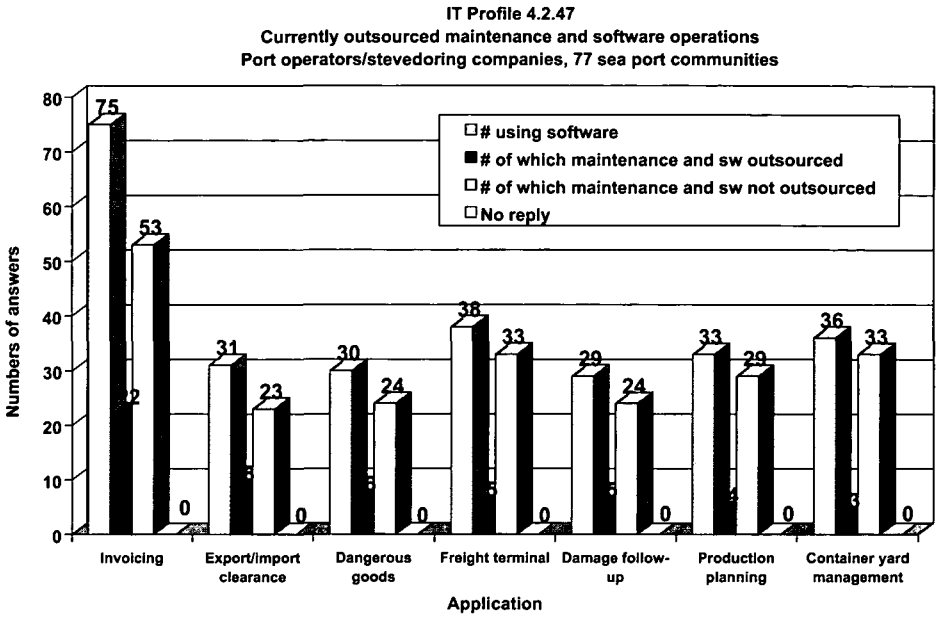


Chart 4.2. 47 - Currently outsourced maintenance and software operations, Port operators/stevedoring companies, 77 sea port communities

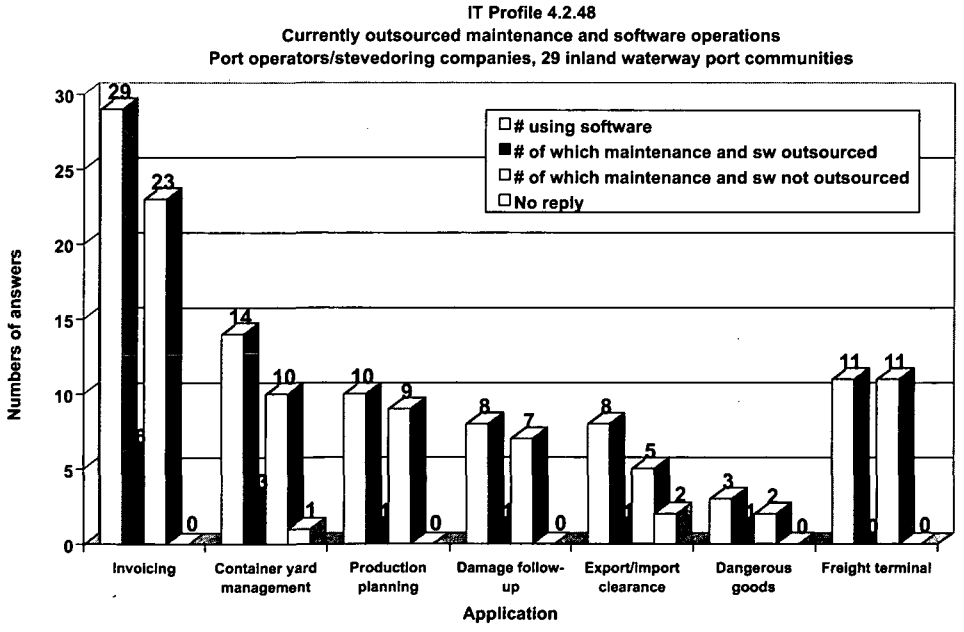


Chart 4.2. 48 - Currently outsourced maintenance and software operations, Port operators/stevedoring companies, 29 inland waterway port communities

The most frequently outsourced maintenance and software operations were the invoicing, export/import clearance, and dangerous goods management applications in the 77 sea ports. In the 29 inland waterway ports it was the invoicing and container yard management applications that were the most frequently outsourced maintenance and software operations.

In the correlation analysis on the CD-ROM (by total cargo volume only for the sea ports) 11% of the port operators/stevedoring companies in large ports, 13% in medium ports and 33% in small ports outsourced their maintenance and software operations.

* Chart 4.2. 49 - Currently outsourced maintenance and software operations, Total cargo volume, Port operators/stevedoring companies, 29 inland waterway port communities

4.2.8.3 Forwarding companies

The forwarding companies were asked whether they outsourced the maintenance and software operations of their 6 specified applications (but only if they were in fact using such applications).

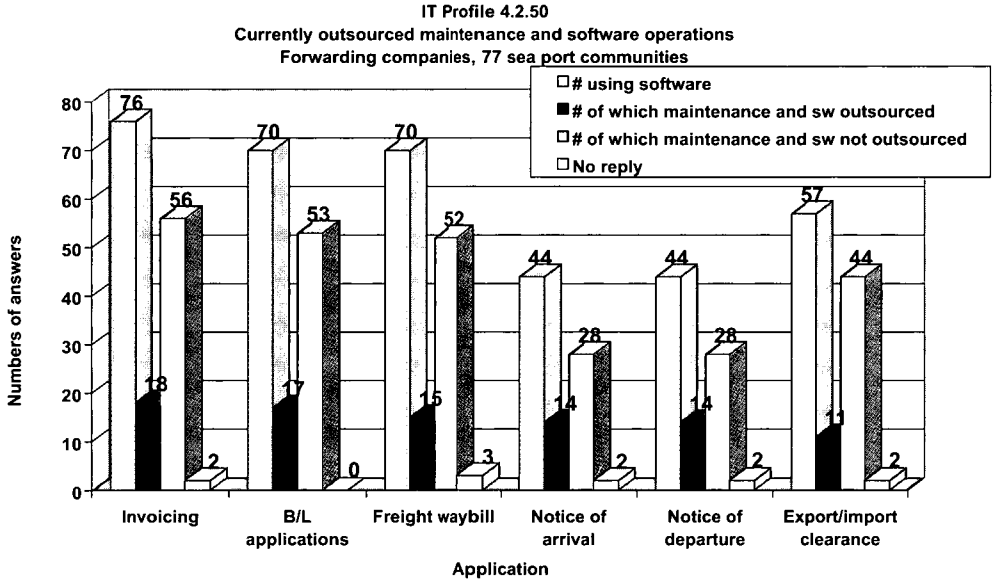


Chart 4.2. 50 - Currently outsourced maintenance and software operations, Forwarding companies, 77 sea port communities

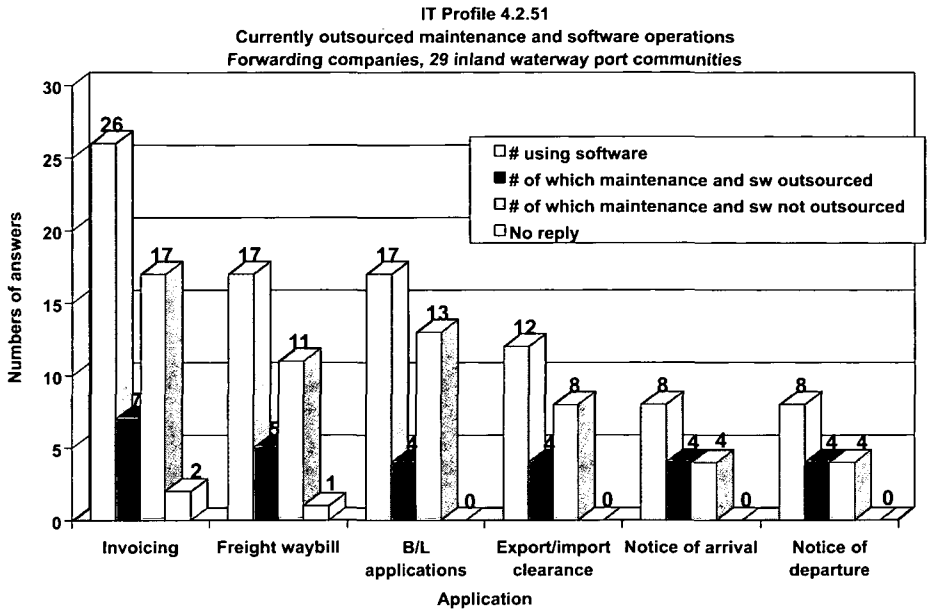


Chart 4.2. 51 - Currently outsourced maintenance and software operations, Forwarding companies, 29 inland waterway port communities

Outsourcing of the maintenance and software operations of the specified applications of the forwarding companies in both sea and inland waterway ports is under 20%.

In the correlation analysis (total cargo volume only for the sea ports) almost half of the forwarding companies in large ports have outsourced the maintenance and software operations, and less than 20% in the medium and small ports.

The detailed correlation analysis can be seen on the CD-ROM as:

* Chart 4.2. 52 - Currently outsourced maintenance and software operations, Total cargo volume, Forwarding companies, 77 sea port communities

4.2.8.4 Trucking companies

Trucking companies were asked about outsourcing of the maintenance and software operations for their 3 specified applications.

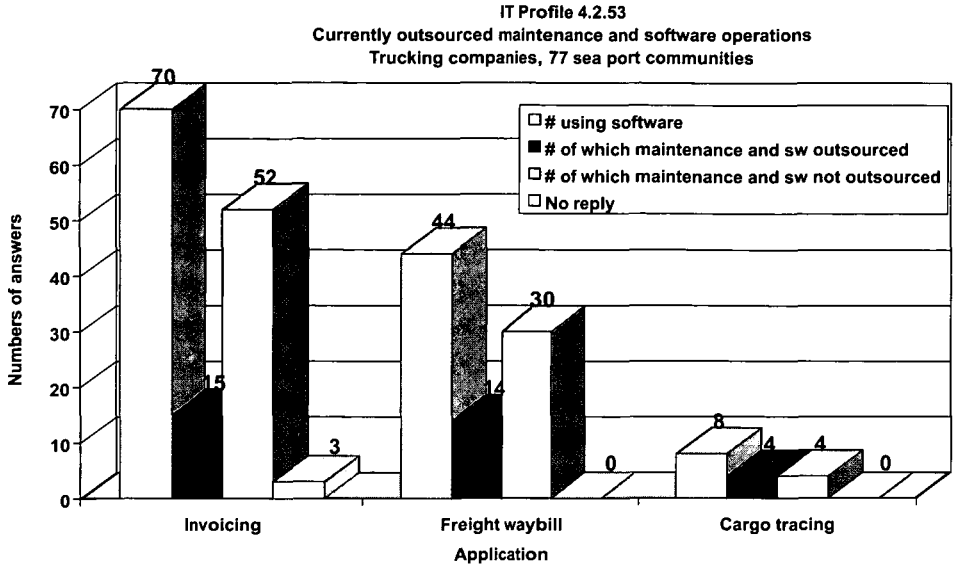


Chart 4.2. 53 - Currently outsourced maintenance and software operations, Trucking companies, 77 sea port communities

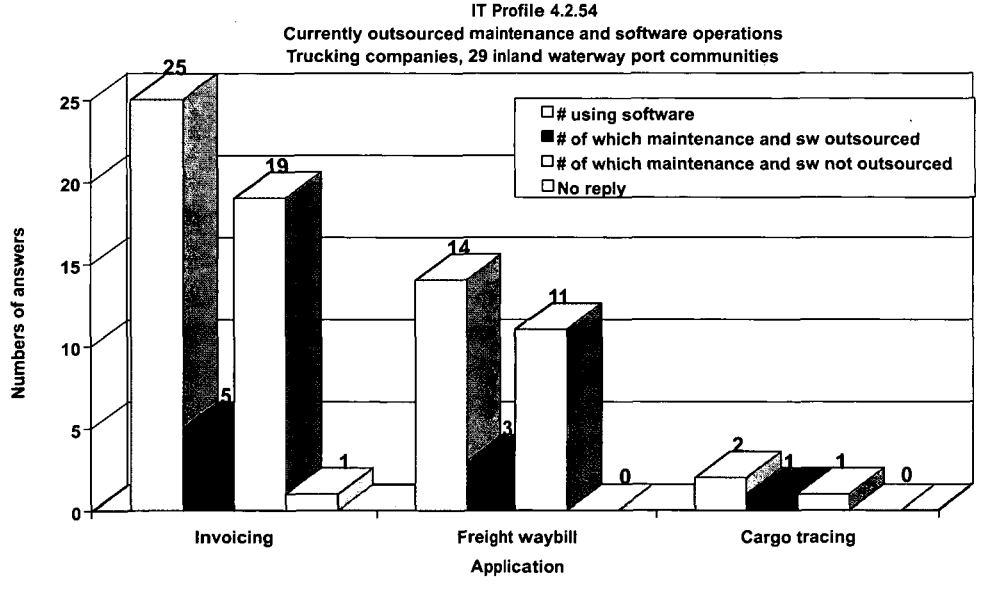


Chart 4.2. 54 - Currently outsourced maintenance and software operations, Trucking companies, 29 inland waterway port communities

Outsourcing of the maintenance and software operations in trucking companies both in sea and inland waterway ports is at a minor level.

4.2.8.5 Railway companies

The railway companies were asked about their current outsourcing of the maintenance and software operations for 3 specified applications.

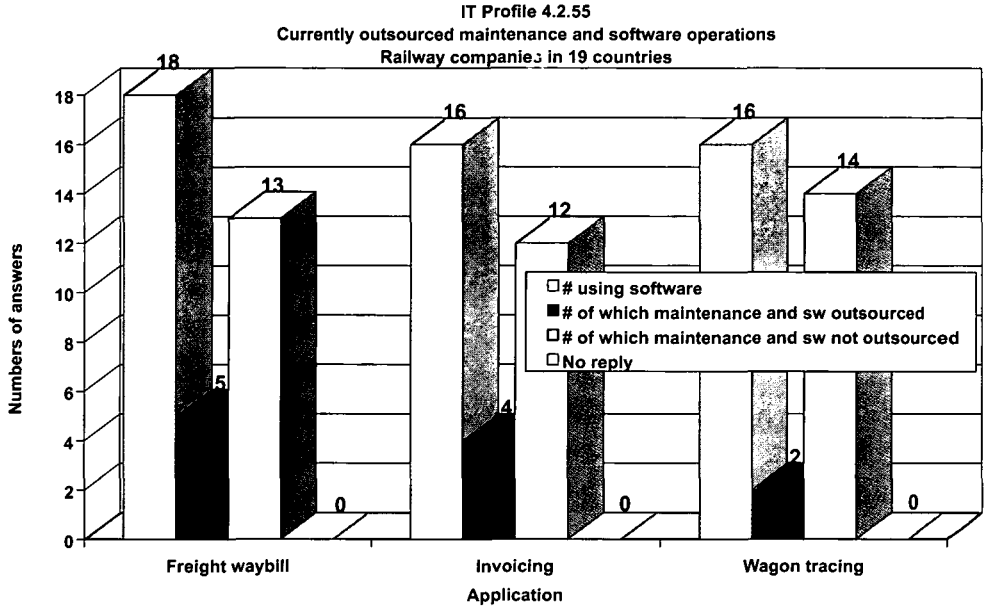


Chart 4.2. 55 - Currently outsourced maintenance and software operations, Railway companies in 19 countries

Less than one third of the maintenance and software operations of the freight waybill and invoicing applications of the railway companies in 19 countries were outsourced. Hardly any outsourcing was done on tracing applications.

4.2.8.6 Customs Authorities

Customs authorities in 19 countries were asked the current outsourcing of the maintenance and software operations for 4 specified applications.

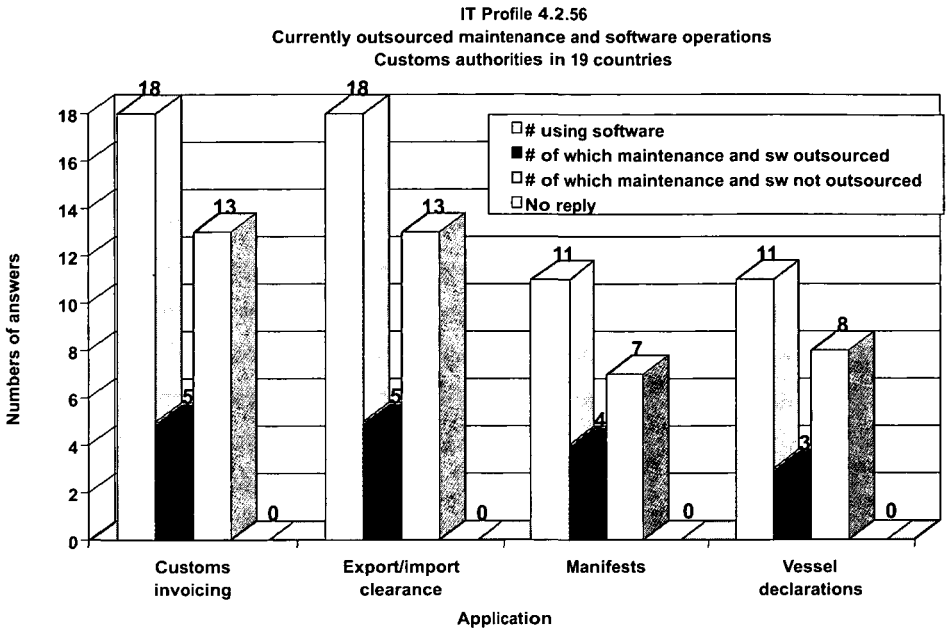


Chart 4.2. 56 - Currently outsourced maintenance and software operations, Customs authorities in 19 countries

Less than one third of the customs authorities in 19 countries have currently outsourced their maintenance and software operations for their specific applications.

4.2.9 Problems with old software and old hardware

It was assumed that old software and hardware may have an influence (or be an obstacle) on the development of the IT systems in ports. Port community partners were asked if they had problems with old software and/or old hardware.

The port community partners replied, giving scores from 0-5: zero indicated 'no problem' while a Five indicated 'problem'. For purpose of the analysis it was decided that all replies less than 3 suggested 'no problem' and replies of 3 and above expressed a 'problem'. The analysis are presented as two categories: no problem (codes 0, 1 and 2) and problem (codes 3, 4 and 5).

The distribution of the replies (all partners in sea and inland waterway ports) for the number of problems with old software and old hardware is shown below. Note that the responses for Railways and Customs refer to the 19 countries, while the rest refers to the 77 sea and 29 inland waterway port communities.

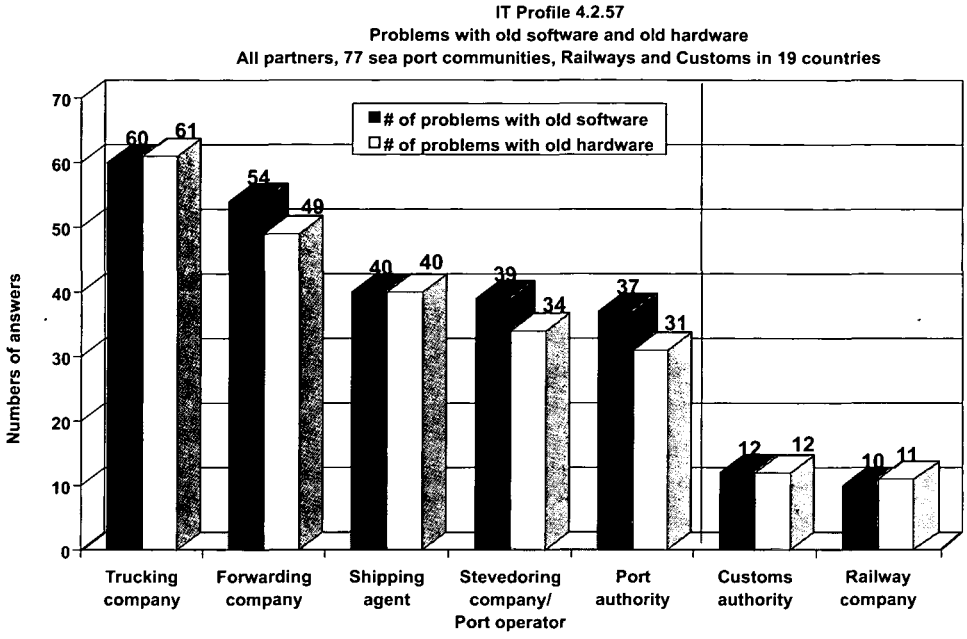


Chart 4.2. 57 - Problems with old software and old hardware, All partners, 77 sea port communities, Railways and Customs in 19 countries

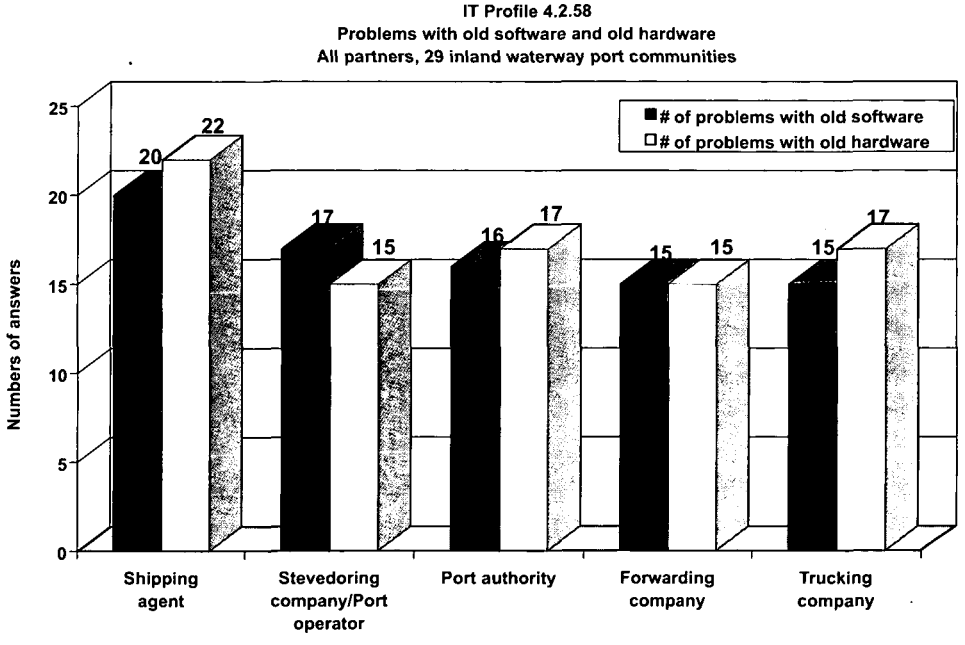


Chart 4.2. 58 - Problems with old software and old hardware, All partners, 29 inland waterway port communities

Most of the port community partners report that old software and old hardware is a problem.

In sea ports, the trucking and forwarding companies report the highest number of problems. In inland waterway ports all partners have problems with old software and old hardware.

4.2.10 Use of data communication networks

Networks and means of communications in port communities are described in this section.

The results describe the role of data communications networks in the telematics of the port community partner. Thus the questions were formulated to allow analysis of the following modes of communication:

VAN	Value Added Network.
Other Networks	A network supplier, local PTT companies. It includes also telephone lines, LAN (Local Area Network) in office and in port area.
PCS	Port Community System.
Mobile	GSM and other types of mobile communications.
Satellite	LEO (Low Earth Orbit satellites), Inmarsat and other types.

The port community partners were asked which 'networks' are in use in their daily operations. The results are reported in the charts below:

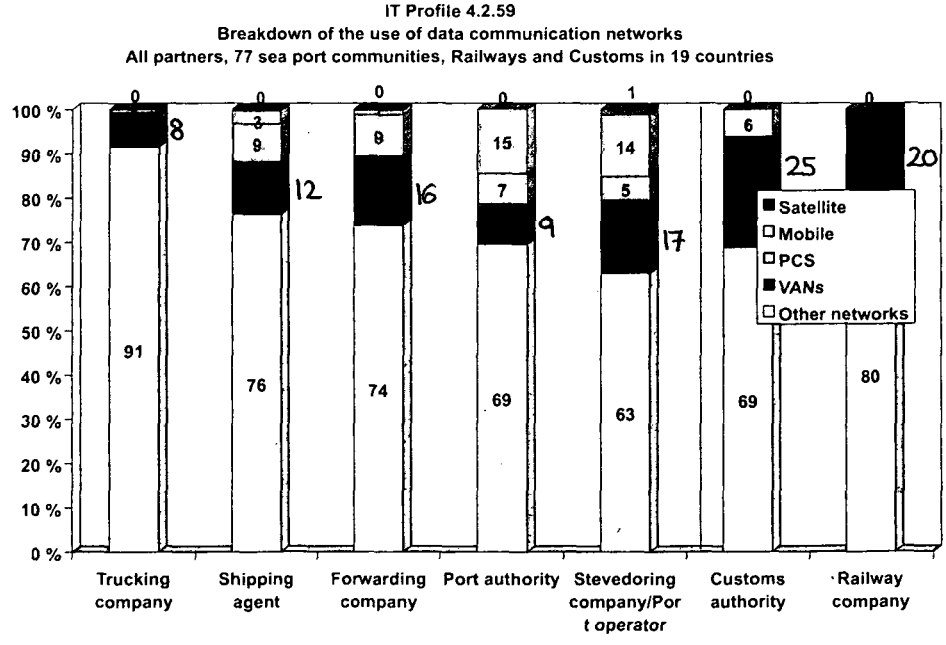


Chart 4.2. 59 - Breakdown of the use of data communication networks, All partners, 77 sea port communities, Railways and Customs in 19 countries

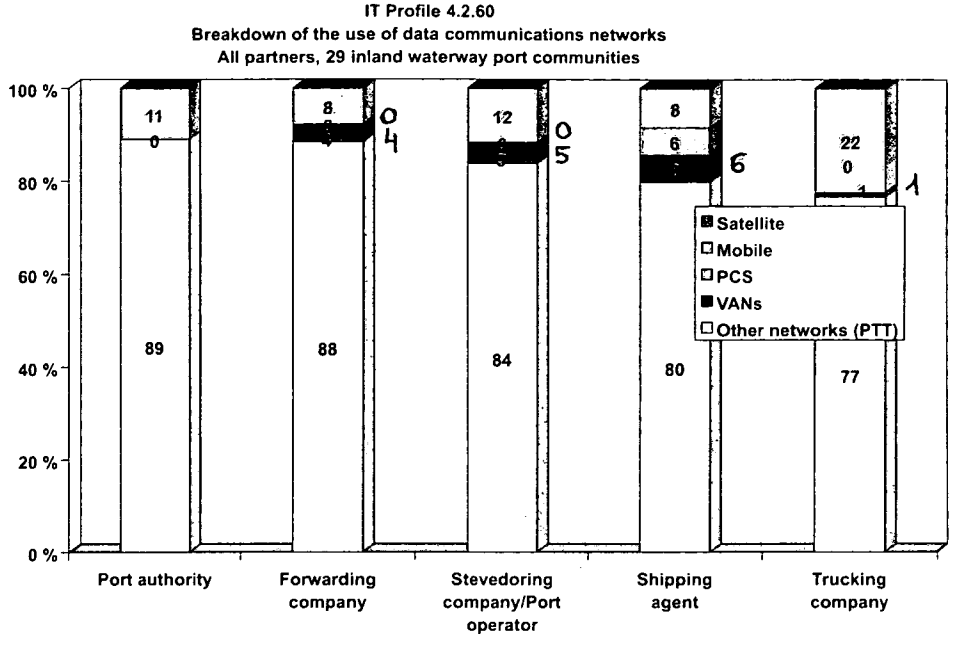


Chart 4.2. 60 - Breakdown of the use of data communication networks, All partners, 29 inland waterway port communities

The usual mode of data communications (75%) over all partners in the sea ports was 'other' networks. Of the indicated systems, 12% used VANs; 5% mobile communication; 6% Port Community Systems; only 2% used satellite communications systems. There are some inland waterway port communities where there is a local PCS application, but these applications are not in active use.

We note that VANs are mostly used for data communication in sea ports by the port operators/stevedoring companies (17%), by the forwarding companies (16%) and by the customs and railways.

The breakdown of the use of the data communication networks is analysed separately for the EDI and non-EDI users. The results are shown in section 4.4.

4.2.11 Lack of telecommunication infrastructure, expensive telecommunications

The IT profiling questioned the telecommunication infrastructure of the ports. Two questions were posed - one asking if there was a lack of telecommunication infrastructure, and the other upon the level of expenditure on telecommunications.

The distribution of the replies (all partners, 77 sea ports and 29 inland waterway ports) for the questions is shown in the following charts:

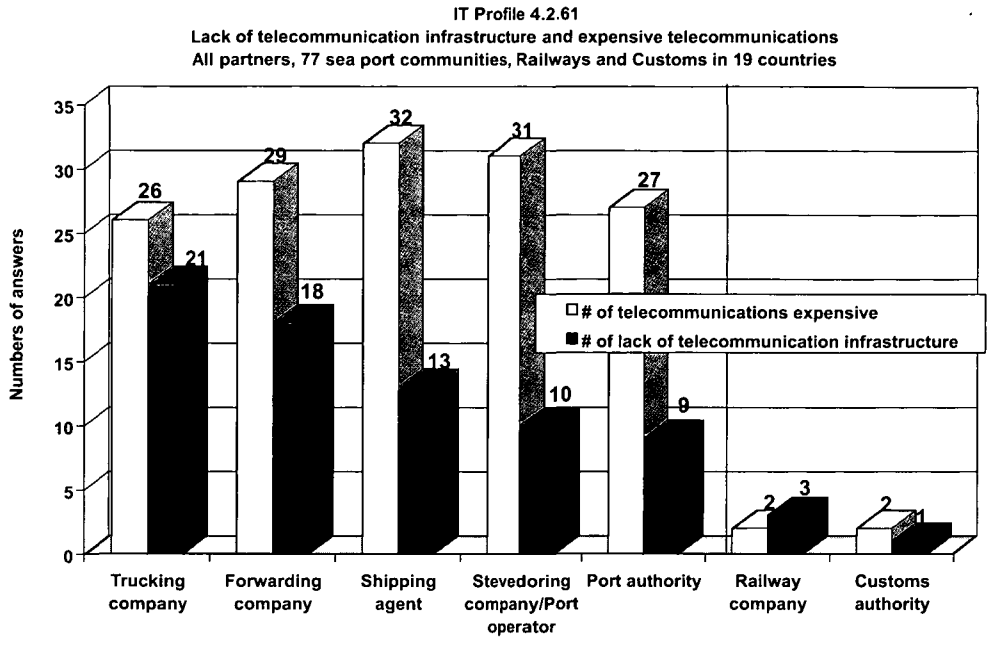


Chart 4.2. 61 - Lack of telecommunication infrastructure and expensive telecommunications, All partners, 77 sea port communities, Railways and Customs in 19 countries

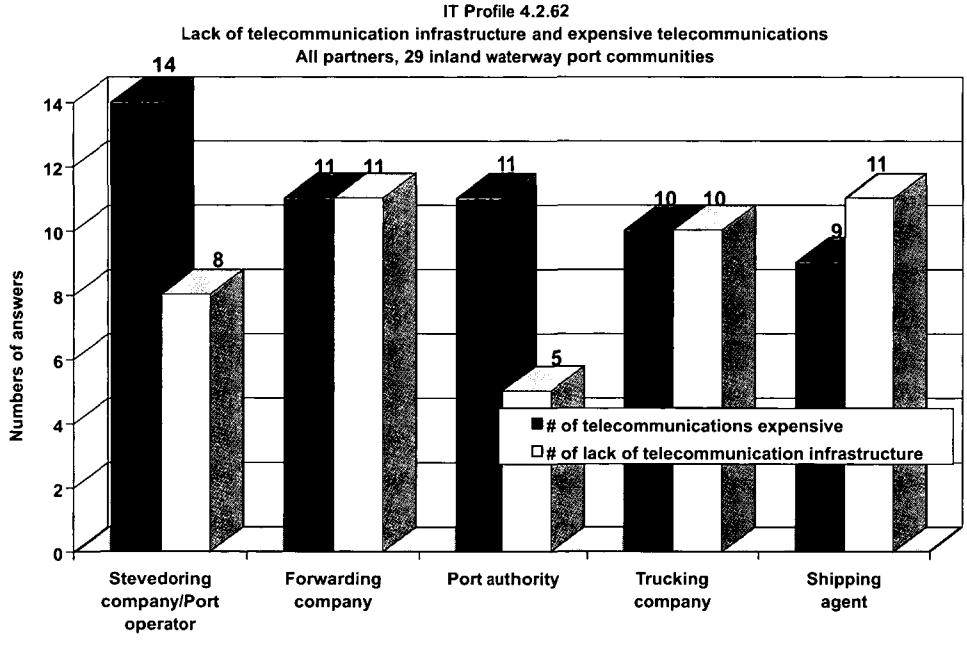


Chart 4.2. 62 - Lack of telecommunication infrastructure and expensive telecommunications, All partners, 29 inland waterway port communities

The lack of telecommunication infrastructure centres mainly with the trucking and forwarding companies - both in sea and inland waterway ports. Generally all the partners, both in sea and inland waterway ports, feel that telecommunications costs are expensive.

However there are some port community partners in this sample of ports who do not have any software applications.

4.2.12 Current use of Internet/Intranet

The main objective of this question is to get a picture of the current use of Internet and Intranet in the port community partners.

NOTE:
- As the use of Internet and Intranet in trucking companies is at a very low level these questions were not asked of them.
- Plans for the use of Internet and Intranet will be described in section 4.5 "Future IT Profile".

The following six questions were posed to the port community partners:

- Do you have 'yellow pages' in Internet/Intranet
- Do you use electronic forms in Internet/Intranet
- Do you use E-mail for free text
- Do you have E-mail for structured forms passing data to/from applications
- Is your WWW service on your own hardware or outsourced
- Do you charge for the Internet/Intranet services.

The distribution of the replies for the port community partners both in 77 sea ports and 29 inland waterway ports are shown in following charts.

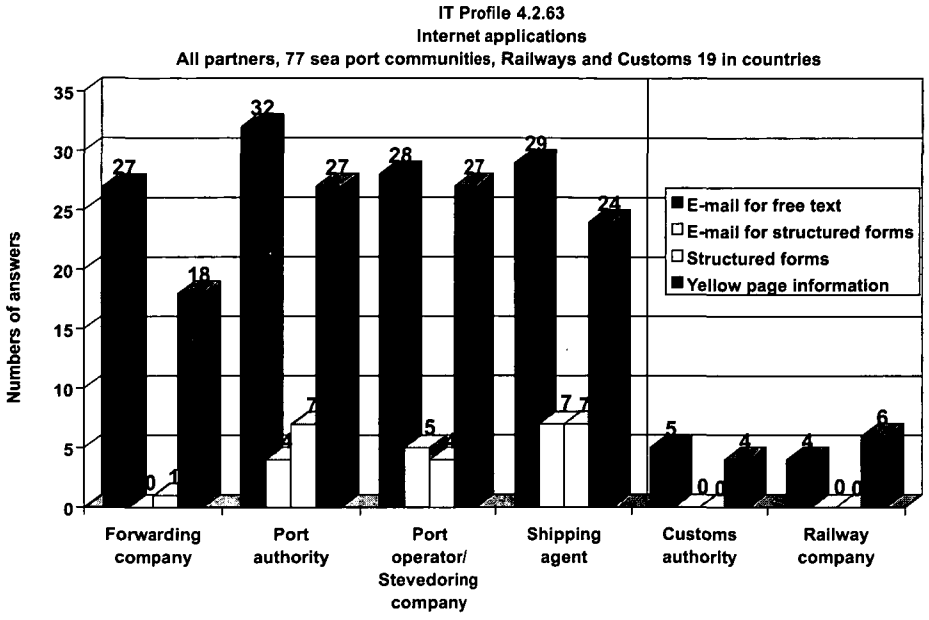


Chart 4.2. 63 - Internet applications, All partners, 77 sea port communities, Railways and Customs in 19 countries

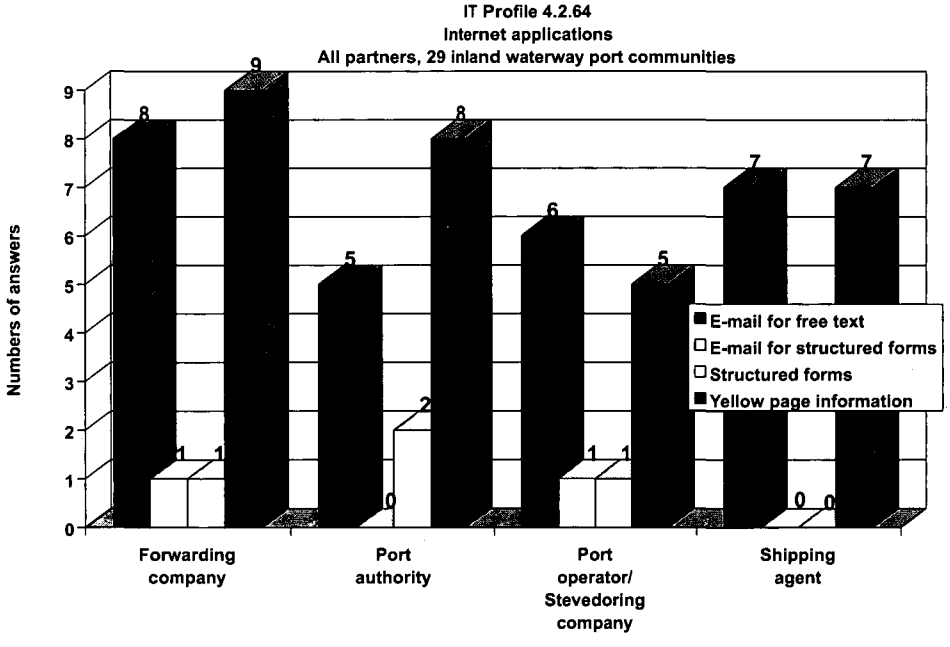


Chart 4.2. 64 - Internet applications, All partners, 29 inland waterway port communities

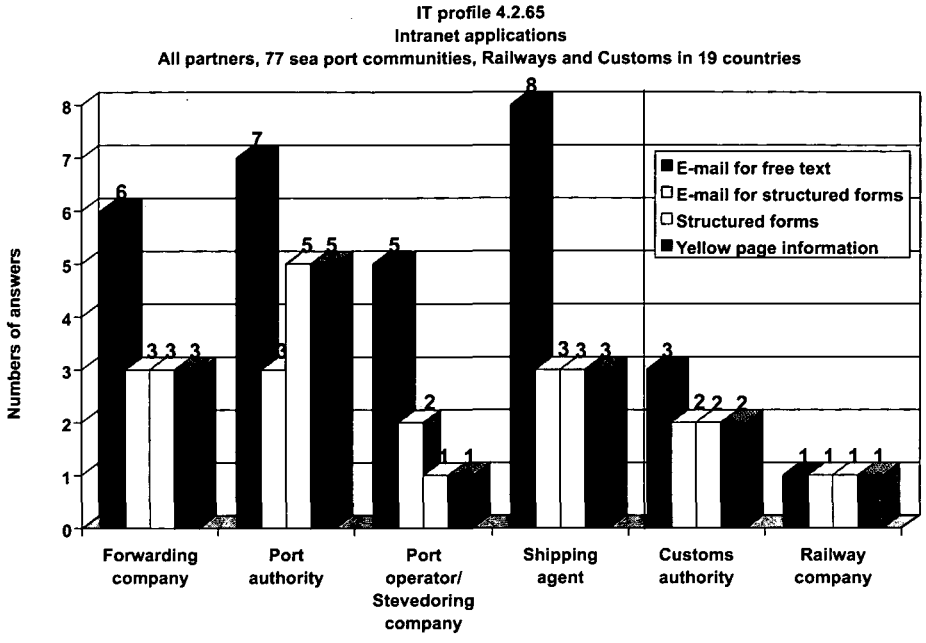


Chart 4.2. 65 - Intranet applications, All partners, 77 sea port communities, Railways and Customs in 19 countries

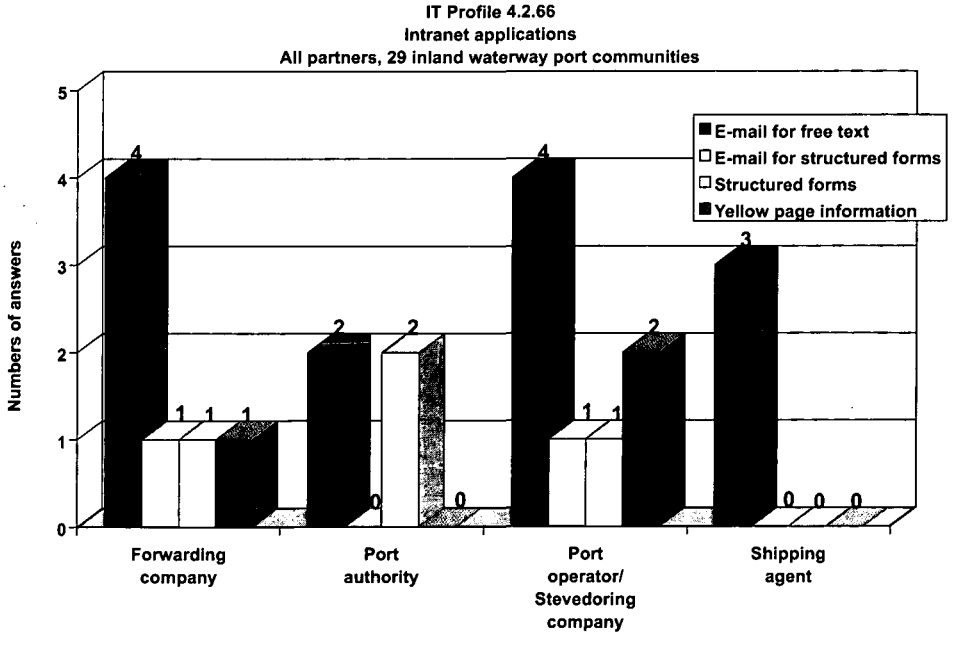


Chart 4.2. 66 - Intranet applications, All partners, 29 inland waterway port communities

Internet is mainly used for sending free text messages and for presenting WWW homepages (about one third of all port partners are doing this, and one quarter of the rail and customs authorities). Only some of the port authorities, port operators/stevedoring companies and shipping agents are using Internet for structured forms from/to their applications.

Very few of the port community partners have Intranet solutions - if in use, they are mainly used for free text and for E-mail/structured forms.

Most of the Intranet services of the port community partners are outsourced to an external service company.

Four port community partners are charging for the Internet/Intranet services. The other partners are giving the Internet/Intranet services free of charge.

4.2.13 IT Profile Findings per Partner

It is to be noted that the selected and/or interviewed respondents in this study represent only a sample of port community partners.

4.2.13.1 Port authorities

1. Number of IT staff

45 port authorities have less than 5 persons in their IT staff, 28 have 5-20 persons and 4 have more than 20 persons in their IT staff.
25 port authorities in inland waterway ports have less than 5 persons in their IT staff, 4 have 5-20 persons, and no ports have more than 20 IT persons.

2. Use of software applications

Among the 106 port authorities there are two port authorities which do not use any of the specified software applications, or have only a simple form of software. It may be said that the inland waterway ports have a 10% less usage of applications than the sea ports.

For the majority of ports, in order of 'popularity' we have: **Invoicing** application is used by almost all port authorities in sea 97% and inland 90% waterway port communities, the second most popular being the **statistics** 82% in sea and 90% in inland waterway port communities. 42% of port authorities in sea and 24% in inland waterway port communities use **dangerous goods management application**. About one third of port authorities in sea and inland waterway port communities use **berth allocation** and **VTS** software applications.

Where the ports have large container volumes, they use VTS and berth allocation software; and the dangerous goods management applications generally exist in ports of the large sea ports category.

3. Software supplier

Half of the software applications of the port authorities (both sea and inland waterway ports) are produced by their own IT staff. Port specific applications are normally developed by the own staff; while general applications, like invoicing, are purchased from external suppliers.

4. Type of operating system

The port authorities (sea and inland waterway ports) generally use client/server solutions and mainframes. Stand alone PCs are used more frequently by the inland waterway ports.

5. Currently outsourced system operations

For the **sea ports** we find that if some applications are outsourced, their system operations may also be outsourced; thus the number of systems operations outsourced are: **invoicing and statistics** (10), **VTS** (4), **berth allocation** (7) and **dangerous goods manifest** (2).

On average 10% of the systems operations and 18% of the maintenance and software operations of the specified 5 applications in the **inland waterway ports** were outsourced.

6. Maintenance and support of the software applications

Approximately 65% of the port authorities (both sea ports and inland waterway ports) do their own maintenance and support of the applications.

7. Currently outsourced maintenance and software operations

Approximately one third of the maintenance and software operations were outsourced. The most frequent applications (for sea ports) were: invoicing (24), statistics (22), dangerous goods management (14) and berth allocation (9).

8. Problems with old hardware and old software

Port authorities in **sea ports** reported that old software (37) and old hardware (31) are problems.
Port authorities in **inland waterway ports** reported that old software (16) and old hardware (17) are problems.

9. Use of data communication networks

The majority, 69% of the data communication of the port authorities in the sea ports is routed via 'other' networks, 15% is by mobile communications and 9% via the VANs with 7% via the PCS.
Similarly, the majority 80% of the data communication of the port authorities in the inland waterway ports is via 'other' types of networks: 6% via the PCS, 6% via the VANs, with 8% by mobile communications.

10. Problem areas in telecommunication infrastructure

Nine port authorities in sea ports reported a lack of telecommunication infrastructure and 27 reported that telecommunication costs are expensive.

Five port authorities in **inland waterway ports** reported that there is a lack of telecommunication infrastructure and 11 reported that telecommunication costs are expensive.

11. Current use of Internet/Intranet

Half of the port authorities in sea ports and some port authorities in inland waterway ports are using Internet for E-mail. Intranet, on the other hand, is used by less than 10% of the port authorities in both sea and inland waterway ports. Naturally, Internet is more used than Intranet.

Most of the port authorities both in sea and inland waterway ports have outsourced their Internet services. No port authority is charging for their Internet/Intranet services.

4.2.13.2 Port operators/Stevedoring companies

1. Number of IT staff

In 56 sea ports, port operators/stevedoring companies have less than 5 persons in their IT staff, 18 have 5-20 persons and 3 have more than 20 persons. 25 port operators/stevedoring companies in inland waterway ports have less than 5 persons and 7 have 5-20 IT persons.

2. Use of software applications

The invoicing application is used in almost all (75) sea ports, and in all inland waterway port operator/stevedoring companies.

All the other noted applications are used in half of the sea port operator/stevedoring companies. The port operators/stevedoring companies in the inland waterways ports have generally 10% less applications than same companies in sea ports.

The freight terminal software application is used by port operators/stevedoring companies in 38 sea ports and by 11 inland waterway ports. **The container yard management software application** is used equally by port operators/stevedoring companies in sea (36) and inland waterway ports (14). **The dangerous goods management software application** is used by 30 port operators/stevedoring companies in sea ports and by 3 inland waterway ports.

The production planning, export/import clearance, damage follow-up software applications are used more in sea port operators/stevedoring companies (30) than by inland waterways (9).

The bulk ports are commonly operated by the importing companies not by stevedoring companies. Small and medium size ports have very few dangerous goods applications. Small sea container ports do not have a container yard management software.

3. Software supplier

Approximately 60% of the port operators/stevedoring companies in sea ports and 70% in inland waterway ports produce their software using their own IT staff. Although software applications, like invoicing, are purchased from external suppliers, those applications which are more specific to particular port operations are normally produced by their own IT staff.

4. Type of operating system

The majority of the applications in the port operators/stevedoring companies are operated on client/server operating systems, but mainframe type systems are in common use. Stand alone PCs are used more in inland than in sea ports.

5. Currently outsourced system operations

In **sea** ports, on average 10% of the system operations of the 7 specified software applications were outsourced; within these, for instance 16% of the invoicing applications were outsourced.

Not more than 6% of the system operations of the 7 software applications at the **inland waterway** port operators/stevedoring companies were outsourced. The only applications outsourced were invoicing and container yard management.

6. Maintenance and support of the software applications

Those applications which are developed locally are normally also locally supported and maintained and thus the external vendors' software is maintained and supported by the external company. Even so, approximately 65% of the port operators/stevedoring companies both in sea and inland waterway ports maintain and support of the software applications using their own IT staff.

7. Currently outsourced maintenance and software operations

In **sea** ports, currently, 18% of the maintenance and software operations of the 7 applications were outsourced. 29% of the maintenance and software operations of the most commonly used application (invoicing) is currently outsourced.

In the **inland waterway** port operators/stevedoring companies there was little outsourcing of the maintenance and software operations: less than 16% of the 7 applications with invoicing applications at 21% being the most popular target.

8. Problems with old hardware and old software

Port operators/stevedoring companies in sea ports reported that old software (39) and old hardware (34) are problems.

Port operators/stevedoring companies in inland waterway ports reported that old software (17) and old hardware (15) are problems.

9. Use of data communication networks

63% of the data communication of the port operator/stevedoring companies in the **sea** ports is via 'other' types of networks, 5% via the PCS, and 17% via the VANs. 14% of the data communication is by mobile communication systems, and 1% of the communication is via satellites.

77% of the data communication of the port operator/stevedoring companies in the inland waterway ports goes via 'other' types of networks. No data communication is going via the PCS and non via the VANs. 22% of the data communication is via mobile communication systems.

10. Problem areas in telecommunication infrastructure

10 port operators/stevedoring companies in **sea** ports reported that there is lack of telecommunications infrastructure and 31 reported that the telecommunications are expensive. 14 port operators/stevedoring companies in **inland waterway ports** reported that there is lack of telecommunications infrastructure and 8 reported that the telecommunications are expensive.

11. Current use of Internet/Intranet

Almost half on the port operators/stevedoring companies in **sea** ports but less than 20% in **inland** waterway ports are using Internet/Intranet for E-mail and homepages. Internet is more used than Intranet.

Most of the port operators/stevedoring companies have Internet services in their own IT environment. There are two port communities where port operators/stevedoring companies are charging for their Internet/Intranet services.

4.2.13.3 Forwarding companies

1. Number of IT staff

70 forwarding companies in sea ports employ less than 5 IT persons, 7 have 5-20 persons in their IT staff. 26 forwarding companies in inland waterway ports have less than 5 persons and 3 have 5-20 IT persons.

2 Use of software applications

80% of forwarding companies in sea ports run the specified software applications. In the inland waterway ports the forwarders run about 50% of those software applications.

Invoicing software application is used in almost all forwarding companies: 76 of the sea ports and 26 inland waterway ports.

The bill of lading/freight waybill software application is also commonly used by forwarding companies in 70 sea ports and in 17 inland waterway ports. **The export/import clearance application** is used by 57 forwarding companies in sea ports and at 12 inland waterway ports. **The notice of arrival/departure software application** is used in 44 of the forwarding companies in sea ports and 8 of the forwarding companies in inland waterway ports.

3. Software supplier

The forwarding companies normally purchase their software from external vendors. On average only 25% of the forwarding companies in sea ports produce their own software. 93% of the software applications of the inland waterways port forwarding companies are purchased from external suppliers. Only the large forwarding companies undertake their own software development.

4. Type of operating system

14% of the forwarders (at sea ports) have mainframe type systems; 72% of the forwarders use client server technology; 12% of the forwarders use stand alone PCs mainly for invoicing and export/import clearance applications. 79% of the forwarders in inland waterway ports use client/servers.

5. Currently outsourced system operations

In the **sea ports** 25% of the system operations of the 6 software applications were outsourced: 25% of invoicing applications, 26% of the bill of lading and 21% of notices of arrival and departures. 34% of the system operations of the 6 software applications in the forwarding companies in the **inland waterway** ports were outsourced, the biggest being the invoicing applications 27%.

6. Maintenance and support of the software applications

Due to their limited number of IT staff members the forwarding companies normally give the maintenance and support of the software applications to external vendors, but 28% of the

forwarding companies in sea port communities maintain and support of the software applications themselves. This is the general arrangement for all forwarders across all port categories. In inland waterway ports 14% of the forwarders maintain the software applications themselves.

7. Currently outsourced maintenance and software operations

20% of maintenance and software operations of the 6 software applications in **sea** ports were outsourced and 33% of the 6 software applications in forwarding companies in the **inland waterway** ports were outsourced.

8. Problems with old hardware and old software

Forwarding companies in **sea ports** reported that old software (54) and old hardware (49) are problems. Forwarding companies in **inland waterway ports** reported that old software (15) and old hardware (15) are problems.

9. Use of data communication networks

74% of the data communication of the forwarding companies in **sea** ports goes via the 'other' type of networks, 16% via the VANs and 9% is via the PCS, and only 1% of the data communication is via mobile communications.

In **inland** waterway ports 88% of the data communication of the forwarding companies is via 'other' types of networks, 4% going via the VANs, and 8% of the data communication is by mobile communications. No data communication goes via the PCS.

10. Problem areas in telecommunication infrastructure

18 forwarding companies in **sea ports** reported that there is lack of telecommunications infrastructure and 29 reported that the telecommunications are expensive. 11 forwarding companies in **inland waterway ports** reported that there is lack of telecommunications infrastructure and 11 reported that the telecommunications are expensive.

11. Current use of Internet/Intranet

The forwarding companies are using Internet mainly for E-mail/free text and for 'yellow pages'. Few forwarding companies are using the structured forms in Internet these are used mainly in Intranet applications.

Half of the forwarding companies have the WWW service on their own hardware. Only one forwarding company is charging for the Intranet services.

4.2.13.4 Trucking companies

1. Number of IT staff

72 trucking companies in sea ports have less than 5 IT persons, and 5 have 5-20 persons in their IT staff. All trucking companies in inland waterway ports have less than 5 persons in their IT staff.

2. Use of software applications

70% of the trucking companies in the sea ports and 50% in inland waterway ports use the specified applications.

Almost all trucking companies in all port communities are using **invoicing software application** (70 in sea and 25 in inland waterway ports). Half of the trucking companies in all ports use **freight waybill software application** (44 in sea and 14 in inland waterway ports).

Only 8 trucking companies in sea ports use **cargo tracing software application** and 2 in inland waterway ports).

3. Software supplier

In the sea ports 16% of the trucking companies use their own software, but only large trucking companies. The small and medium size trucking companies normally have only PCs and the software is purchased from external vendors. 7% of the trucking companies in inland waterway ports produce software applications through their own staff.

The trucking companies purchase their software from external vendors because in general these trucking companies have very limited resources for IT development. Only the large trucking companies undertake their own software development.

4. Type of operating system

The trucking companies both in **sea** and **inland** waterway ports are using mainly stand alone PCs in networks combined with client/server technology. Trucking companies in large ports have tracking and tracing services, and the operating systems are in mainframe type systems.

5. Currently outsourced system operations

20% of the system operations of the 3 software applications in trucking companies in the sea ports were outsourced: 38% of the cargo tracing applications were outsourced. 30% of the system operations of the 3 software applications in trucking companies in the inland waterway ports were outsourced

6. Maintenance and support of the software applications

The trucking companies purchase the maintenance and support of the software applications from external vendors because these trucking companies have very limited resources for their IT. Only the large trucking companies undertake their own maintenance and software support.

7. Currently outsourced maintenance and software operations

20% of the maintenance and software operations of the 3 software applications in trucking companies in sea and in inland waterway ports were outsourced.

8. Problems with old hardware and old software

Trucking companies in sea ports reported that old software (60) and old hardware (61) are a source of problems. Trucking companies in inland waterway ports reported that old software (15) and old hardware (17) are problematic.

9. Use of data communication networks

The vast majority, 91% of the data communication of the trucking companies in sea ports is via 'other' types of networks, 8% via the VANs and 1% via the PCS. Similarly, 89% of the data communication of the trucking companies in inland waterway ports is via 'other' types of networks, the rest 11% is by mobile communication systems.

10. Problem areas in telecommunication infrastructure

21 trucking companies in **sea ports** reported the highest level of lack of telecommunication infrastructure and 26 reported that the telecommunications are expensive. Ten trucking companies in **inland waterway ports** reported that there is lack of telecommunication infrastructure and they feel that the telecommunications are expensive.

11. Current use of Internet/Intranet

Only the biggest trucking companies have some of the asked Internet/Intranet applications. None of the smaller trucking companies have any Internet/Intranet applications.

4.2.13.5 Shipping agents

1. Problems with old hardware and old software

40 shipping agents in **sea ports** have reported that both old software and hardware are problems. 20 shipping agents in **inland waterway ports** reported that old software is a problem and 22 reported that old hardware is a problem.

2. Use of data communication networks

76% of the data communication of the shipping agents in the **sea** ports is via 'other' types of networks, 9% is via the PCS and 12% via the VANs with 3% being via mobile communications. In inland waterway ports, 84% the data communication of the shipping agents is via 'other networks, 12% via mobile communications and 5% being via VANs.

3. Problem areas in telecommunication infrastructure

13 shipping agents in **sea ports** reported that there is lack of telecommunications infrastructure and 32 reported that the telecommunications are expensive. In **inland waterway ports** 11 shipping agents reported that there is lack of telecommunications infrastructure and 9 reported that the telecommunications are expensive.

4. Current use of Internet/Intranet

The shipping agents are using both Internet and Intranet for all of their specified functions, and most of the shipping agents have outsourced their Internet/Intranet services. One shipping agent is charging for Internet/Intranet services.

4.2.13.6 Railway companies

1. Number of IT staff

14 railway companies have more than 20 IT persons, 2 have 5-20 persons, and 3 have less than 5 persons in the IT department.

2. Use of software applications

Almost all railway companies (18) have invoicing application, 16 have applications for freight waybills and wagon tracing.

3. Software supplier

74% of the software of the railways is developed by their own staff.

4. Type of operating system
74% of the railway companies use mainframe type operating systems for their applications, but client/server technology is used by 20% of the railway companies. Stand alone PC applications are used mainly for invoicing.

5. Currently outsourced system operations
Approximately 16% of the railway companies have outsourced their system operations of the 3 applications: 4 invoicing, 1 wagon tracing and 3 freight waybill applications are outsourced.

6. Maintenance and support of the software applications
74% of the software of the railways is maintained by their own staff.

7. Currently outsourced maintenance and software operations
18% of the railway companies in 19 countries have currently outsourced the maintenance and software operations of the freight waybill, invoicing and wagon tracing applications.

8. Problems with old hardware and old software
10 railway companies reported that they have problems with old software and 11 have problems with old hardware.

9. Use of data communication networks
80% of the data communication of the railway companies in the 19 countries is via 'other' types of networks, 20% is via the VANs.

10. Problem areas in telecommunication infrastructure
3 railway companies reported that there is lack of telecommunication infrastructure in their business environment and 2 reported that the telecommunications costs are expensive.

11. Current use of Internet/Intranet
Only 4 railway companies are using Internet for E-mail and 6 have 'yellow pages'. One railway company has Intranet. The railway companies normally have the Internet/Intranet solutions in their own IT environment.

4.2.13.7 Customs authorities

1. Number of IT staff
7 customs authorities have more than 20 IT persons, 8 have 5-20 persons, and 4 have less than 5 persons in the IT department.

2. Use of software applications
18 customs authorities have software for export/import clearance and customs invoicing, and 11 have software for manifests and vessel declarations.

3. Software supplier
40% of the customs software is developed by their own IT staff.

4. Type of operating system
63% of the customs authorities applications are in mainframes with client/server technology. 27% run client/servers, and 10% have stand alone applications.

5. Currently outsourced system operations
25% of the customs authorities have outsourced their system operations of the four stated applications.

6. Maintenance and support of the software applications
53% of the customs authorities do their own maintenance and support of the software applications. It is quite usual to find that the maintenance and support of the customs authorities' software applications is done by a government, centralised computer centre.

7. Currently outsourced maintenance and software operations
27% of the customs authorities in 19 countries have currently outsourced the maintenance and software operations of the customs invoicing, export/import clearance and vessel declaration applications. 36% of customs authorities the maintenance and software operations of the manifest applications are outsourced.

8. Problems with old hardware and old software
12 customs authorities reported that they have problems with both old software and old hardware.

9. Use of data communication networks
69% of the data communication of the customs authorities in 19 countries is via 'other' types of networks, 6% via the PCS, and 25% via the VANs.

10. Problem areas in telecommunication infrastructure
Only 1 customs authority reported that there is lack of telecommunication infrastructure in their business environment and 2 reported that the telecommunication costs are expensive.

11. Current use of Internet/Intranet
5 customs authorities have Internet for E-mail and 'yellow pages' and 3 have Intranet. Most of the Internet/Intranet solutions of the customs authorities are in their own IT environment.

The summary charts for the IT profiles of the port community partners can be seen on the CD-ROM as:

* Chart 4.2. 67 - IT profile summary, Port authorities, 77 sea port communities
* Chart 4.2. 68 - IT profile summary, Port authorities, 29 inland waterway port communities
* Chart 4.2. 69 - IT profile summary, Port operators/stevedoring companies, 77 sea port communities
* Chart 4.2. 70 - IT profile summary, Port operators/stevedoring companies, 29 inland waterway port communities
* Chart 4.2. 71 - IT profile summary, Forwarding companies, 77 sea port communities
* Chart 4.2. 72 - IT profile summary, Forwarding companies, 29 inland waterway port communities
* Chart 4.2. 73 - IT profile summary, Trucking companies, 77 sea port communities
* Chart 4.2. 74 - IT profile summary, Trucking companies, 29 inland waterway port communities
* Chart 4.2. 75 - IT profile summary, Railway companies in 19 countries
* Chart 4.2. 76 - IT profile summary, Customs authorities in 19 countries

4.3 EDI Profile of the Port Community Partners

4.3.1 Introduction

The main objective of this section is to describe the use of EDI, at present and in the future, the use of Edifact messages, problems of message exchange, the cost elements of EDI usage, and the legal aspects of EDI.

EDI in the analysis includes two types of data structures: Edifact and non-Edifact. EDI does not imply Edifact, but Edifact implies EDI.

This section explains why the use of EDI is limited to certain partners in the port communities and the problems for EDI development.

The port community partners were asked the total number of transactions/documents per year and how these documents were delivered to the other partners. It gives an initial indication of the amount of EDI (Edifact or non Edifact messages) usage between the partners.

The estimation of the role of EDI messages for the port community partners has been difficult because different types of messages are reported.

The inland waterway ports have been analysed only on summary level for all port community partners.

The number of partners using EDI is also reported.

As some port community partners have millions of EDI messages and some partners only thousands, the results are shown on percentile basis. Cargo information from the shippers to the different port community partners has not been asked in the study.

The results are reported on the following 10 items:

Item 1 ***Use of EDI of the port community partners and breakdown of the EDI messages in use***
The number of the port community partners using EDI is reported at summary level for all partners and for each partner EDI use of the set of different type of documents (34).

Item 2 ***Number of EDI partners of the port community partners***
The number of the partners using EDI with the port community partners is reported at a summary level for all partners.

Item 3 ***Number of EDI messages in use***
The total number of EDI messages used by the port community partners is reported as a summary for all partners.

Item 4 ***Breakdown of the Edifact messages by name, current and future use***
The use of, and the planned use of the Edifact messages by message name is shown here.

Item 5 ***Current and future Edifact and non-Edifact messages by name in use***
Currently used Edifact or non-Edifact messages. Also the planned Edifact or non-Edifact messages are mentioned here.
A list of the most commonly used Edifact messages is included in the section.

Item 6 ***Problems in message exchange, EDI users and non EDI users***
Seven specified problem areas in message exchange were asked of the port community partners:

- *Is there a lack of Edifact messages?*
- *Are the investments in EDI too expensive?*
- *Is Edifact too complicated?*
- *Do you lack trained staff?*
- *Are EDI projects complicated ?*
- *Not enough partners?*
- *Do you have problems in application interfaces?*

The results are analysed separately for EDI users and non EDI users.

The analysis of the use of data communication networks of the EDI and non-EDI users is reported here. The use of the data communication networks for all port community partners was reported in Section 4.2.10.

Item 7 ***EDI investments and operating costs of EDI applications***
Current cost distribution and the future cost distribution of EDI investments and EDI operating costs.

Item 8 ***Cost elements of EDI applications on operative level***
Cost elements of EDI; Subscription fee, Message and Data communication costs.

Item 9 ***Legal aspects of EDI***
Legal approval of EDI messages as commercial documents in the participating countries. he legal aspects of EDI are reported on a country level.

4.3.2 Use of EDI of port community partners and breakdown of the EDI messages in use

The port community partners were asked which documents are sent in EDI format to other partners. The EDI user numbers in the port communities have been generated from these replies.

The first two charts show the number of individual port community partners using EDI. The following charts show the number of individual port community partners using EDI for specified documents, and document exchange.

4.3.2.1 All partners using EDI

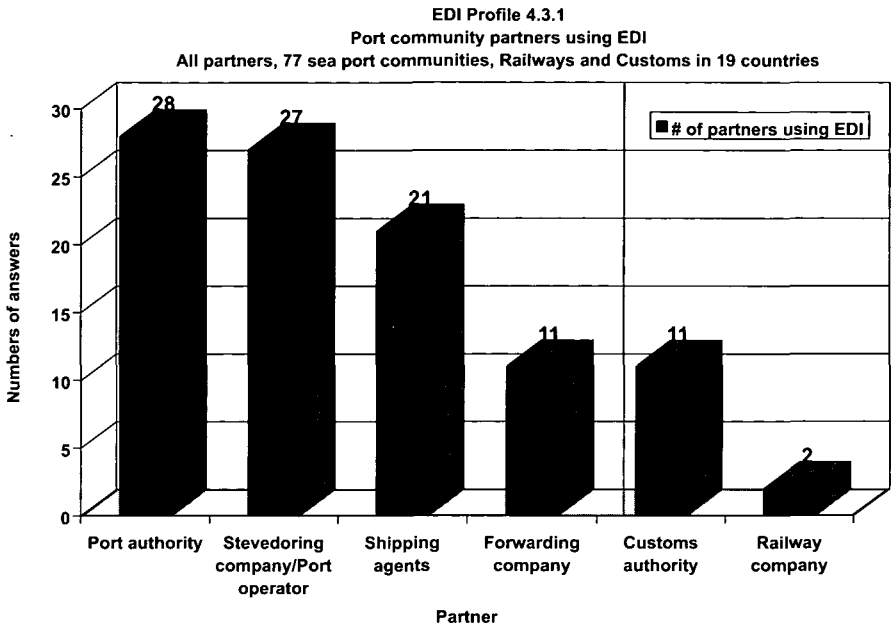


Chart 4.3. 1 - Use of EDI, All partners, 77 sea port communities, Railways and Customs in 19 countries

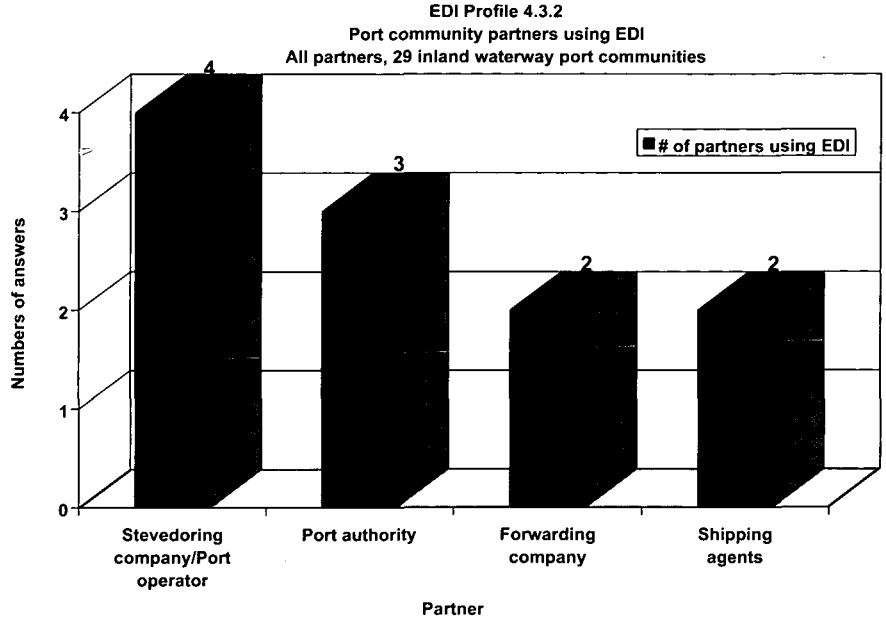


Chart 4.3. 2 - Use of EDI, All partners, 29 inland waterway port communities

The trucking companies in this sample have not reported any EDI message exchange with the other partners in the port communities.

4.3.2.2 Port Authorities

The port authorities were asked which of 7 different documents are sent and received in EDI format:

- Cargo manifests
- Dangerous goods information
- Berth allocation information
- Other types of documents
- Invoices
- Stowage plans
- Time schedules

The distribution of each document used by port authorities in sea ports is shown below.

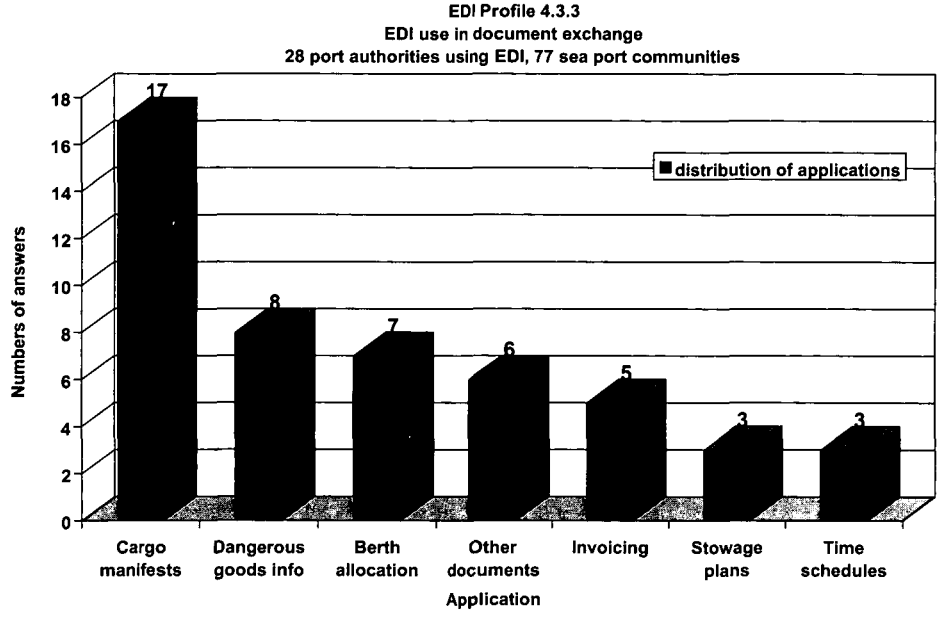


Chart 4.3. 3 - EDI use in document exchange, 28 port authorities using EDI, 77 sea port communities

In some ports cargo manifests are transmitted to the customs authorities by the port authorities.

Further analysis including the correlation parameters (total cargo volume) has been done only for the sea ports and is shown on the CD-ROM. In sea ports 17 port authorities are using EDI for cargo manifests, 13 port authorities in the large, 2 in the medium and 2 in the small ports.

7 sea port authorities use EDI for berth allocation, 6 in the large and 1 in the medium category ports.

Dangerous goods information in sent in EDI format by 8 port authorities in sea ports, 6 in the large and 2 in the small ports category. Three port authorities which belong to the large sea ports use EDI for stowage plans.

* Chart 4.3. 4 - EDI use for specified documents, Total cargo volume, Port authorities, 77 sea port communities

4.3.2.3 Port operators/stevedoring companies

The port operators/stevedoring companies have reported on their use of 5 different types of documents sent and received in EDI:

- Cargo manifests
- Stowage plans
- Dangerous goods information
- Other types of documents
- Time schedules

The distribution of each document type of the port operators/stevedoring companies in sea ports is shown below.

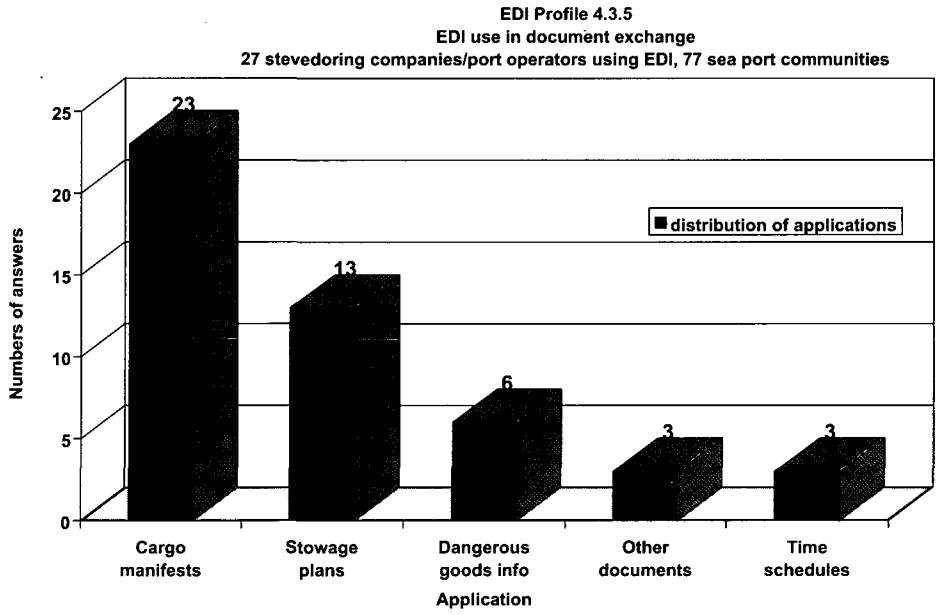


Chart 4.3. 5 - EDI use in document exchange, 27 port operators/stevedoring companies using EDI, 77 sea port communities

The port operators/stevedoring companies are normally the receivers of EDI messages. In some ports the port operators/stevedoring companies deliver the stowage plans to the shipping companies/shipping agents, but sender of the messages is normally the shipping lines/shipping agents.

A further correlation analysis by total cargo volume shown on the CD-ROM has been done only for the sea ports. In the sea ports 23 port operators/stevedoring companies are using EDI for cargo manifests, 11 of the large, 4 of the medium and 8 of the small ports. For dangerous goods information 6 port operators/stevedoring companies in sea ports are using EDI, 3 large and 3 medium size ports.

13 port operators/stevedoring companies in sea ports use EDI for stowage plans 11 in the large and 2 in the medium category ports. 3 port operators/stevedoring companies use EDI for time schedules, 1 belonging to the large, 1 to the medium and 1 to the small sea ports.

* Chart 4.3. 6 - EDI use for specified documents, Total cargo volume, Port operators/stevedoring companies, 77 sea port communities

4.3.2.4 Forwarding companies

The forwarding companies have been asked which of 3 different documents are sent and received in EDI:

- Export/import clearance
- Dangerous goods information
- Other types of documents

The distribution of total message flow of the forwarding companies in sea ports is shown below.

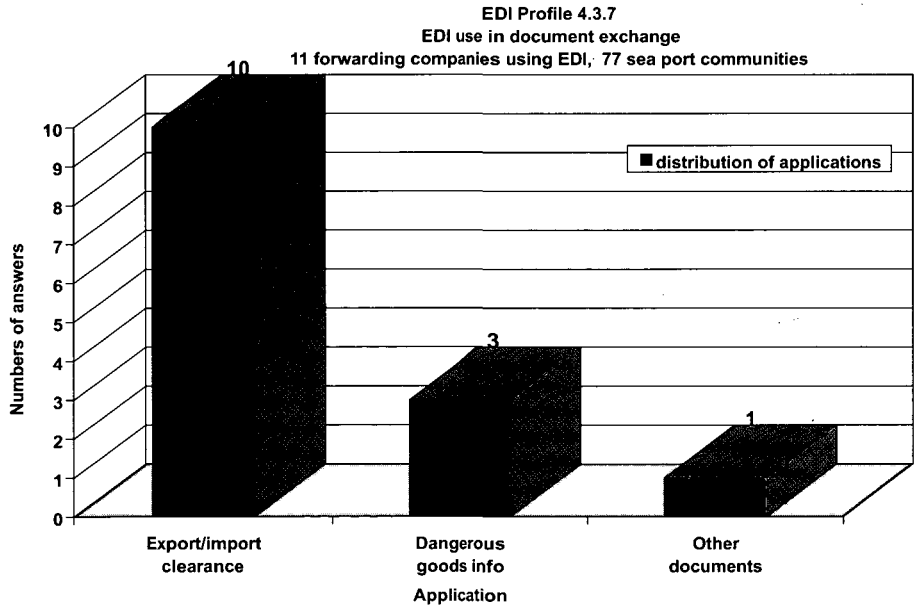


Chart 4.3. 7 - EDI use in document exchange, 11 forwarding companies using EDI, 77 sea port communities

The forwarders normally send EDI messages (export and import clearance) to the customs authorities and to the shipping lines/shipping agents. In some ports the forwarding companies send the dangerous goods information directly to the port authorities and to the port operators/stevedoring companies.
A correlation analysis (total cargo volume) was done only for the sea ports and is shown on the CD-ROM as:

* Chart 4.3. 8 - EDI use for specified documents, Total cargo volume, Forwarding companies, 77 sea port communities

Ten forwarding companies use EDI for export and import clearance of cargoes, 5 large, 2 medium and 3 small category sea ports (total tons). For dangerous goods information 3 forwarding companies are using EDI, 2 in large ports and 1 in small ports.

4.3.2.5 Shipping agent

The shipping companies/shipping agents have been asked which of the following 9 documents are sent and received in EDI:

- Cargo manifests
- Cargo bookings
- Stowage plans
- Dangerous goods information
- Customs manifests
- Booking confirmations
- Time schedules
- Freight invoices
- Other types of documents

The distribution of total message flow on individual messages of the shipping agents in sea ports is shown below.

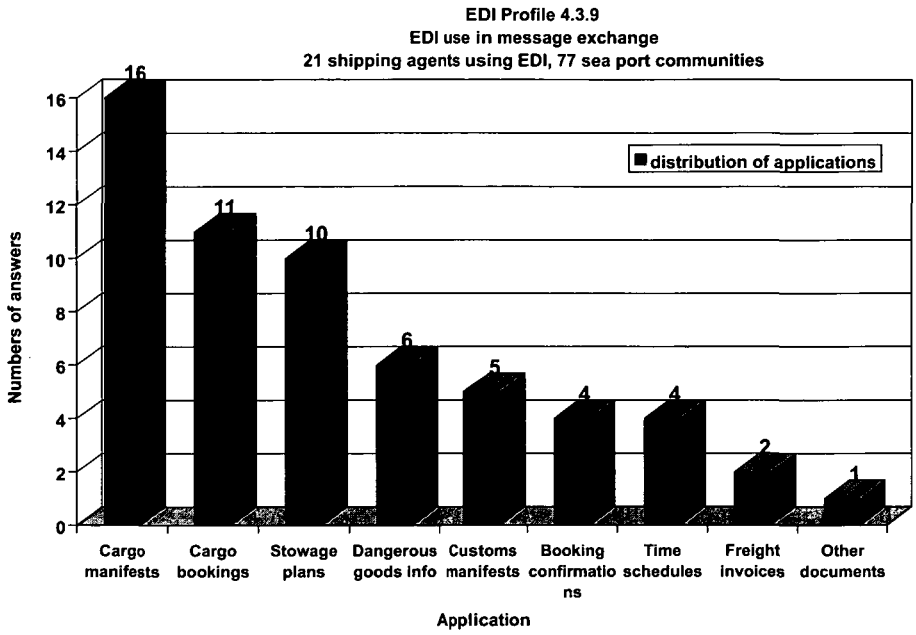


Chart 4.3. 9 - EDI use in document exchange, 21 shipping agents using EDI, 77 sea port communities

The shipping agents normally send manifest messages to the customs and port authorities, the port operators/stevedoring companies and the shipping lines/shipping agents of other ports. In the majority of the ports the shipping agents send the dangerous goods information directly to the port authorities and the port operators/stevedoring companies. The bookings are received from the clients who also receive booking confirmations from the shipping agents.

A correlation analysis (total cargo volume) has been done only for the sea ports and is shown on the CD-ROM as:

* Chart 4.3. 10 - EDI use for specified documents, Total cargo volume, Shipping agents, 77 sea port communities

The most common use of EDI is in cargo manifests, used by 16 shipping agents in sea ports, 10 shipping agents in large, 3 in medium and 3 in the small port category. EDI for cargo bookings is used by 11 shipping agents in sea ports communities, 5 in large, 1 in medium and 5 in small port category. 10 shipping agents in sea ports are using EDI for stowage plans, 8 shipping agents in large and 2 in the medium category.

Six shipping agents in sea ports are using EDI for dangerous goods information, 3 shipping agents in large, 1 in medium and 2 in small category. Five shipping agents in sea ports are using EDI for customs manifests, 3 shipping agents in large, 1 in medium and 1 in small category. Four shipping agents in sea ports are using EDI for booking confirmations, 3 in large and 1 in small port category.

4.3.2.6 Railway companies

The railway companies were asked the use of 3 different documents:

- Freight waybills
- Dangerous goods information
- Freight invoices

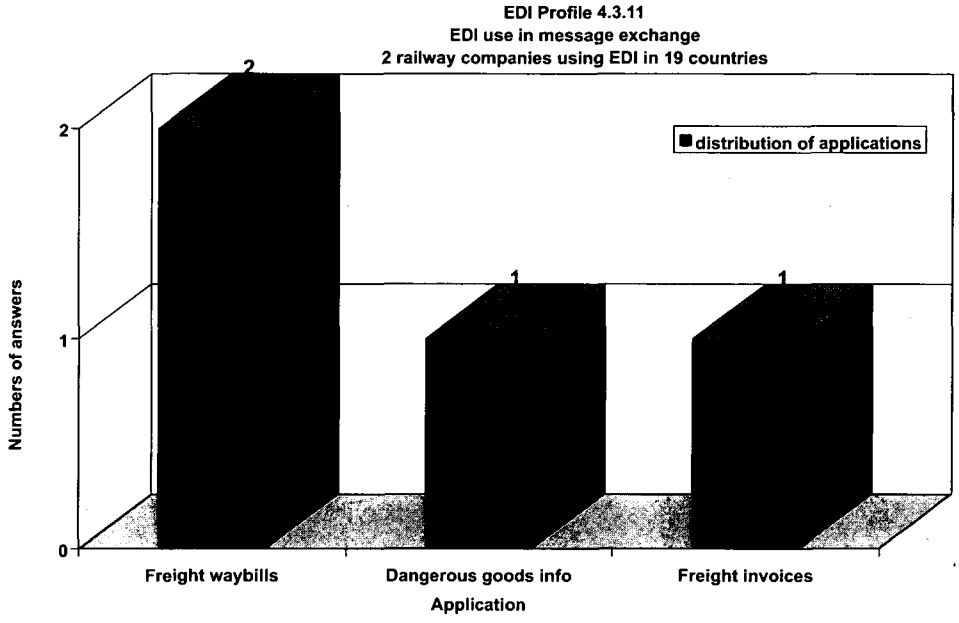


Chart 4.3. 11 - EDI use in document exchange, 2 railway companies using EDI in 19 countries

The railway companies normally receive the freight waybills and dangerous goods information from the partners. The railway companies send the freight invoice messages to their clients.

4.3.2.7 Customs authorities

The customs authorities have been asked which documents are sent and received in EDI. Four different types of documents have been noted:

- Cargo declarations
- Customs manifests
- Customs releases
- Vessel declarations

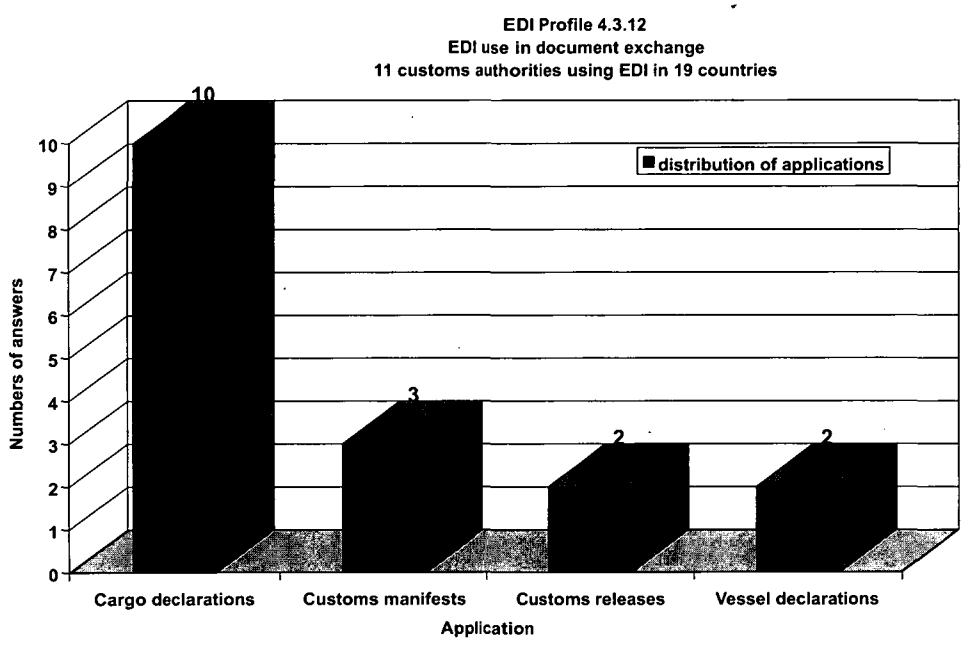


Chart 4.3. 12 - EDI use in document exchange, 11 customs authorities using EDI in 19 countries

The customs authorities normally receive all the documents from the partners, mainly from the forwarding companies and from the shipping agents. In some ports the port authorities transmit the cargo manifests to the customs authorities.

4.3.3 Number of EDI partners of the port community partners

The number of EDI partners is based on the data reported on the questionnaires. In **inland waterway ports** there are only a few partners using EDI.

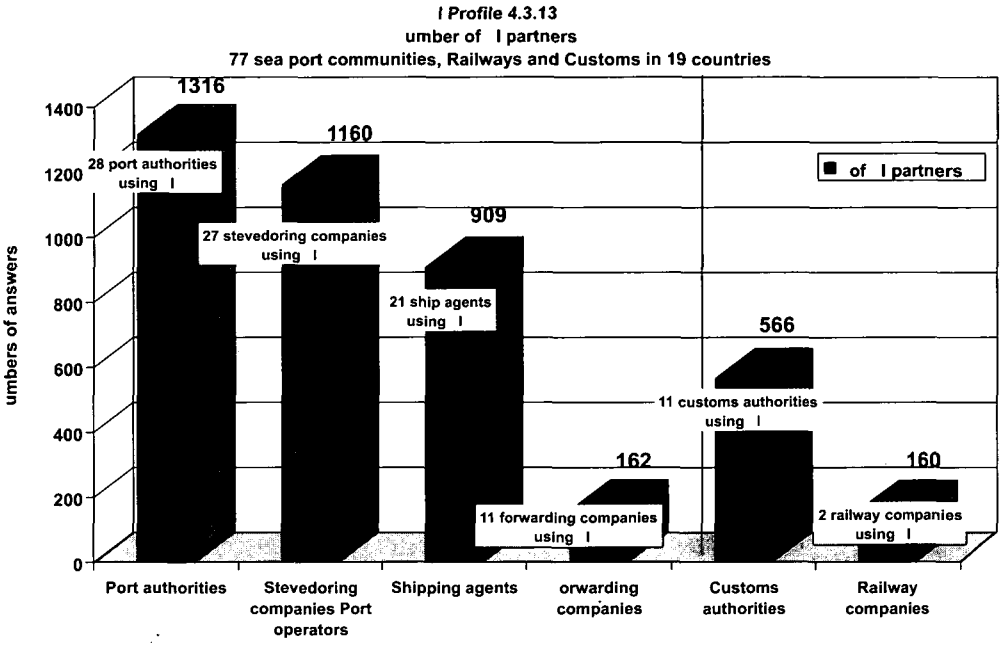


Chart 4.3. 13 - Number of EDI partners, 77 sea port communities, Customs and Railways in 19 countries

4.3.4 Number of EDI messages in use

The charts resulting from this question have been difficult to produce. It is to be remembered that there are two types of partners in the port communities; there are partners like port authorities, railway companies and customs authorities who can be represented by only one partner in each port. On the other hand, there may be hundreds of partners like forwarding companies,port operators/stevedoring companies, shipping agents and trucking companies per one port community. In this COST Action port authorities, railway companies and customs authorities are represented by only one company per each port community, whereas forwarding companies,port operators/stevedoring companies, shipping agents and trucking companies are represented by a sample from the same port community.

According to the results from the questionnaire port authorities have reported that they have approximately 19 million EDI messages per year, customs authorities 3 million, and railway companies 2 million EDI messages per year.

There are EDI messages reported by the other partners: shipping agents 2,2 million messages, forwarding companies 1,2 million messages, and port operators/stevedoring companies 0,6 million messages per year.

4.3.5 Breakdown of the Edifact messages by name, current and future use

Current and Future use of Edifact -messages Breakdown of Edifact messages by name All partners, total number of messages in use		
Name of message	77 sea and 29 inland waterway port communities	
	# of Edifact messages current use	# of Edifact messages future use
CUSREP	42	9
BAPLIE	34	8
IFTDGN	34	1
CUSDEC	33	1
IFCSUM	17	8
CUSCAR	13	1
BOOREQ	10	0
BOOACC	5	0
IFTM*	5	4
IFTMAN	5	5
IFTTOI	4	0
SHIPAC	4	4
IFTMIN	3	0
COARR	2	1
CODECO	2	1
IFTMCS	2	0
IFTMBC	1	1
IFTMBP	1	11
IFT	1	1
COPARN	0	5
EDIMAN	0	1

Chart 4.3. 14 - List of Edifact -messages, current and future use

**Some of the port communities have replied that they are using IFTM as an individual message. But this Action understands IFTM as the framework of messages for the transport industry.*

A detailed list and implementation areas of the Edifact messages is shown in the Appendix 5.

4.3.6 Current and future Edifact and non-Edifact messages in use

The partners have been asked about their current and future use of Edifact or non-Edifact messages.

The analysis of how many partners are using Edifact or non-Edifact messages and how many of them are planning to use Edifact or non-Edifact messages is shown on the CD-ROM as:

* Chart 4.3. 15 - Current and future use of Edifact/Non-Edifact messages, Port authorities, 106 port communities
* Chart 4.3. 16 - Current and future use of Edifact/Non-Edifact messages, Port operators/stevedoring companies, 106 port communities
* Chart 4.3. 17 - Current and future use of Edifact/Non-Edifact messages, Forwarding companies, 106 port communities
* Chart 4.3. 18 - Current and future use of Edifact/Non-Edifact messages, Trucking companies, 106 port communities
* Chart 4.3. 19 - Current and future use of Edifact/Non-Edifact messages, Shipping agents, 106 port communities
* Chart 4.3. 20 - Current and future use of Edifact/Non-Edifact messages, Railways and Customs, 19 countries

4.3.7 Problems in message exchange, EDI users and non EDI users

The port community partners, already using EDI, were asked their main problems in the message exchange.

The distribution of replies for problems in message exchange of all partners in 77 sea port communities using EDI is shown below:

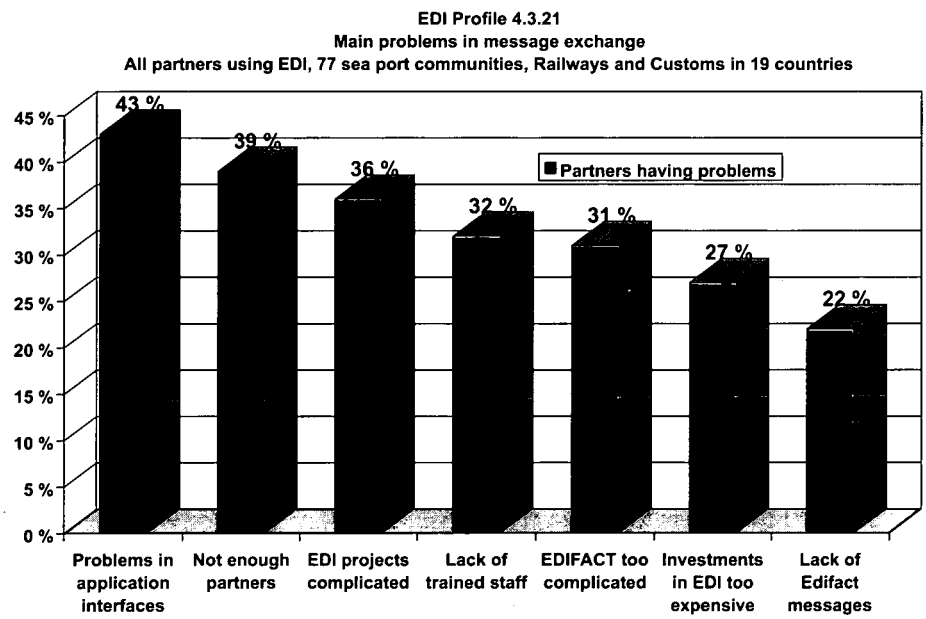


Chart 4.3. 21 - Main problems in message exchange, All partners using EDI, 77 sea port communities, Railways and Customs in 19 countries

The distribution of replies for problems in message exchange of all partners 77 sea port communities **not using** EDI is shown below:

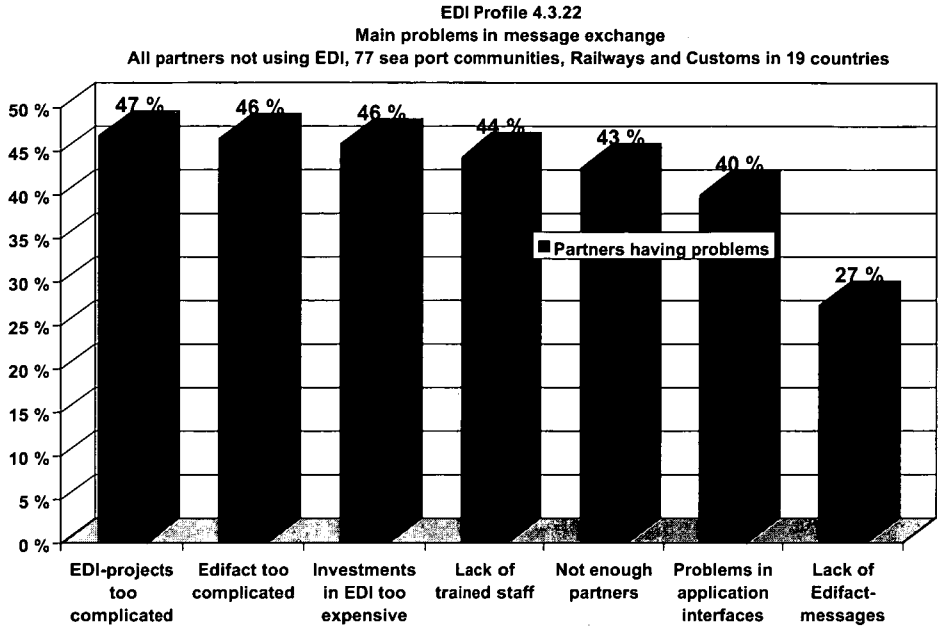


Chart 4.3. 22 - Main problems in message exchange, All partners not using EDI, 77 sea port communities, Railways and Customs in 19 countries

The distribution of replies for problems in message exchange of all partners in 29 inland waterway ports using EDI is shown below:

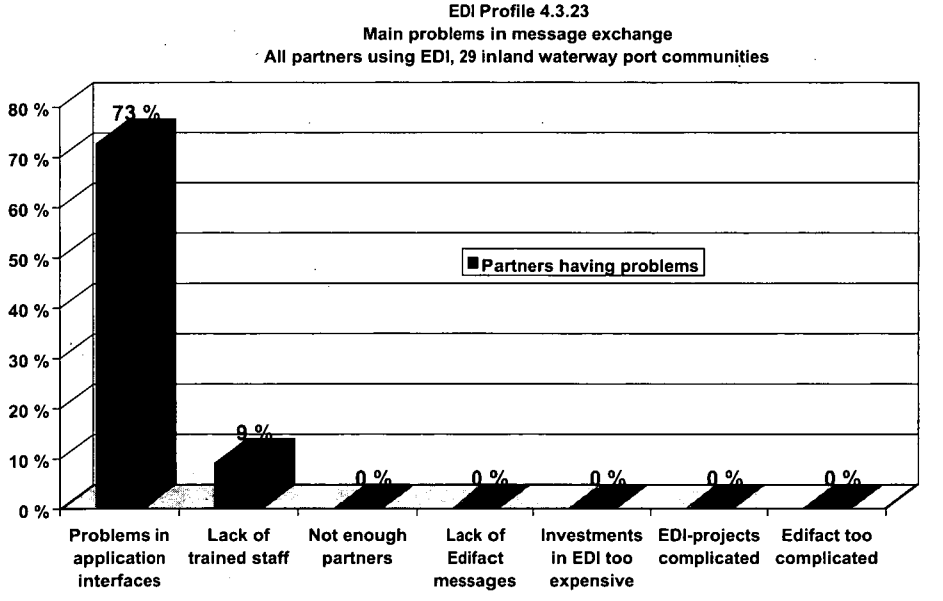


Chart 4.3. 23 - Main problems in message exchange, All partners using EDI, 29 inland waterway port communities

The distribution of replies for problems in message exchange of all partners in 29 inland waterway port communities **not using** EDI is shown below:

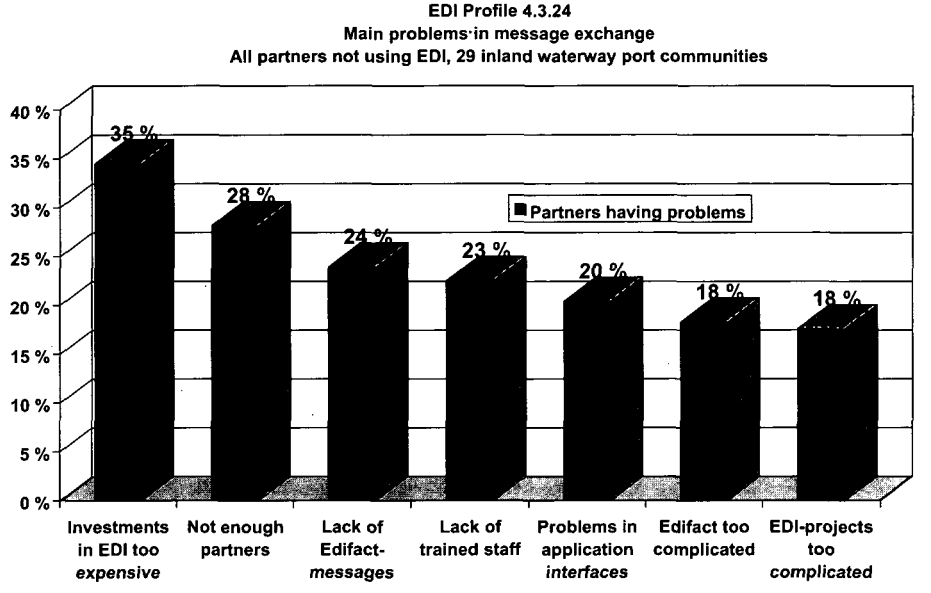


Chart 4.3. 24 - Main problems in message exchange, All partners not using EDI, 29 inland waterway port communities

The main problems in message exchange for the individual port community partners can be seen on the CD-ROM as:

* Chart 4.3. 25 - Main problems in message exchange, Port authorities using EDI, 77 sea port communities
* Chart 4.3. 26 - Main problems in message exchange, Port authorities not using EDI, 77 sea port communities
* Chart 4.3. 27 - Main problems in message exchange, Port operators/stevedoring companies using EDI, 77 sea port communities
* Chart 4.3. 28 - Main problems in message exchange, Port operators/stevedoring companies not using EDI, 77 sea port communities
* Chart 4.3. 29 - Main problems in message exchange, Forwarding companies using EDI, 77 sea port communities
* Chart 4.3. 30 - Main problems in message exchange, Forwarding companies not using EDI, 77 sea port communities
* Chart 4.3. 31 - Main problems in message exchange, Trucking companies not using EDI, 77 sea port communities
* Chart 4.3. 32 - Main problems in message exchange, Shipping agents using EDI, 77 sea port communities
* Chart 4.3. 33 - Main problems in message exchange, Shipping agents not using EDI, 77 sea port communities
* Chart 4.3. 34 - Main problems in message exchange, Railway companies using EDI in 19 countries
* Chart 4.3. 35 - Main problems in message exchange, Railway companies not using EDI in 19 countries
* Chart 4.3. 36 - Main problems in message exchange, Customs authorities using EDI in 19 countries
* Chart 4.3. 37 - Main problems in message exchange, Customs authorities not using EDI in 19 countries

The analysis of the use of the data communication networks for all port community partners, using EDI or not using EDI shows that VANs are mostly used by customs authorities using EDI. The Port Community Systems are mainly used by port authorities using EDI.

The non-EDI port community partners are mainly using other types of networks for the data communication.

The detailed charts for the use of communication networks, EDI and non-EDI users can be seen on the CD-ROM as:

* Chart 4.3. 38 - Breakdown of the use of data communication networks, All partners using EDI, 77 sea port communities, Railways and Customs in 19 countries
* Chart 4.3. 39 - Breakdown of the use of data communication networks, All partners not using EDI, 77 sea port communities, Railways and Customs in 19 countries

4.3.8 EDI investments and the operating costs of EDI applications

The EDI investments and the operating costs of EDI applications were requested from the port community partners. 11 specified questions were presented for the current and future situation:

- EDI hardware
- EDI converter software
- Application interfaces
- Message implementation
- Consulting costs
- Telecommunication software
- Training
- Own manpower costs
- External vendor costs
- Maintenance
- Transmission fees

For investments in EDI infrastructure (currently-future) and for operating costs (currently-future) the results are presented in the section 4.3.11: EDI Profile Findings.

4.3.9 Cost elements of EDI applications on operative level

Following detailed questions were asked from the port community partners:

Do you charge new EDI partners for a subscription fee?
User cost per message:
- *Fixed price per message*
- *Time based*
- *Per Kbytes*

Communication costs:
- *Who gains - pays*
- *Specific agreement with partners*

The results are reported in the section 4.3.12: EDI Profile Findings and detailed charts for each of the questions can be seen on the CD-ROM.

The detailed charts for the **use of a subscription fee** can be seen on the CD-ROM as:

* Chart 4.3. 40 - Use of a subscription fee, All partners, 77 sea port communities, Railways and Customs in 19 countries
* Chart 4.3. 41 - Use of a subscription fee, All partners, 29 inland waterway port communities

The detailed charts for the type of **message costs** can be seen on the CD-ROM as:

* Chart 4.3. 42 - Fixed message price, All partners, 77 sea port communities, Railways and Customs in 19 countries
* Chart 4.3. 43 - Time based message price, All partners, 77 sea port communities, Railways and Customs in 19 countries
* Chart 4.3. 44 - Price per Kbytes, All partners, 77 sea port communities, Railways and Customs in 19 countries
* Chart 4.3. 45 - Fixed message price, All partners, 29 inland waterway port communities
* Chart 4.3. 46 - Time based message price, All partners, 29 inland waterway port communities
* Chart 4.3. 47 - Price per Kbytes, All partners, 29 inland waterway port communities

The detailed charts for the **data communication costs** can be seen on the CD-ROM as:

* Chart 4.3. 48 - Data communication costs-specific agreement, All partners, 77 sea port communities, Railways and Customs in 19 countries
* Chart 4.3. 49 - Data communication costs-who gains-pays, All partners, 77 sea port communities, Railways and Customs in 19 countries
* Chart 4.3. 50 - Data communication costs-specific agreement, All partners, 29 inland waterway port communities
* Chart 4.3. 51 - Data communication costs-who gains-pays, All partners, 29 inland waterway port communities

4.3.10 Legal aspects of EDI

Following detailed questions were asked of the port community partners:

- *Do you make an EDI agreement with your EDI partners?*
- *Who has the legal liability of data contents?*
- *Is the control message used for legal reasons?*
- *Are the contents of messages secured during data transmission?*
- *Are EDI messages legally approved in your country, public sector/private sector?*

The results are reported in the section 4.3.12: EDI Profile Findings and detailed charts for each of the questions can be seen on the CD-ROM.

4.3.11 Regional distribution

The analysis for the regional distribution (Baltic, North Sea and Atlantic, Mediterranean and Black Sea and inland waterway port communities) has been done for two items: Port community Partners using EDI and main problems in message exchange.

4.3.11.1 All partners using EDI

The use of EDI seems to be evenly spread among the Mediterranean, North Sea and Atlantic and Baltic sea port communities who participated in this study. However, we have to keep in mind that these ports are only representing a sample of all national ports.

The use of EDI is much lower in the inland waterway port communities than in the sea port communities.

The leading EDI users among the Mediterranean and Baltic sea port communities seem to be the port authorities, port operators/stevedoring companies and shipping agents. Among the Baltic sea port communities the leading is some more in port operators/stevedoring companies than in port authorities. On the contrary, the leading of EDI use among the North Sea and Atlantic port communities is the port authorities followed by the port operators/stevedoring companies.

The geographical distribution of the Port Community Partners using EDI can be seen on the CD-ROM as:

* Chart 4.3. 52 - Port community partners using EDI, Regional distribution, All partners, 106 port communities, Railways and Customs in 19 countries

4.3.11.2 Main problems in message exchange

The main problem areas in message exchange seem to be quite equally distributed between the regional port communities. The Baltic port communities have reported the lowest problem areas for "not enough partners" and for "investments in EDI too expensive". The Mediterranean port communities have reported that "EDI projects are complicated".

The detailed chart for main problems in message exchange, regional distribution can be seen on the CD-ROM as:

* Chart 4.3. 53 - Main problems in message exchange, Regional distribution, All partners, 106 port communities, Railways and Customs in 19 countries

4.3.12 EDI Profile Findings

1. Use of EDI of the port community partners and breakdown of the EDI messages in use

The largest EDI users of the port community partners in **sea ports** are port authorities (28). Others using EDI are port operators/stevedoring companies (27) and shipping agents (21) and forwarding companies (11). 11 customs authorities and 2 railway companies in 19 countries are using EDI. In **inland waterway ports** the largest EDI users are port operators/stevedoring companies (4), others being port authorities (3), and shipping agents (2) and forwarding companies (2).

In this sample the trucking companies do not have EDI with the port community partners.

The most common use of EDI is cargo manifests for most of the port community partners. Although invoicing in general is the most commonly used application by all the port community partners, only 5 port authorities use EDI for invoicing. Other use of EDI varies according to different port community partners' own preferences

EDI use in applications

The port authorities have reported that cargo manifests represent 36%, dangerous goods information 16%, and berth allocation messages 14% of the total number of messages. Other types of documents (internal reporting to the local institutions) are 12% of the total message flow, invoices 10%, stowage plan and time schedule messages 5% each.

Of the total message flow of the port operators/stevedoring companies in sea ports 48% are cargo manifests, 27% stowage plans, 13% dangerous goods information, 6% other documents. Also 6% of the total port operators/stevedoring companies' message flow in sea ports are time schedule messages.

72% of the total messages of the forwarding companies in sea ports are for export/import clearance, 21% dangerous goods information and 7% other documents.

27% of the total message flow of the shipping agents in sea ports consists of the cargo manifests, 19% cargo bookings, 17% stowage plans, 10% dangerous goods information, 8% customs manifests, 7% booking confirmations, 7% time schedule information, 3% freight invoices and 2% other types of documents.

Freight waybills are 50% of the total number of messages of the railway companies reported in the questionnaire, dangerous goods information and freight invoice messages cover 25% each of the total message flow.

Cargo declarations are 58% of the total number of messages of the customs authorities reported in the questionnaire, customs manifests are 18%, customs release messages 12%, and vessel declarations are 12% of the total message flow.

2. Number of EDI partners of the port community partners

28 port authorities in the report have a total of 1316 EDI partners. On average port authorities have 47 EDI partners. The biggest individual port community partner using EDI has 300 EDI partners and the smallest has less than 5 EDI partners.

3. *Number of EDI messages in use*

In this study the port authorities are the largest users of EDI messages. The total number of messages was 19 million messages.

4. Breakdown of the Edifact messages by name, current and future use

The most frequently used Edifact messages are: CUSREP, BAPLIE, IFTDGN, CUSDEC, and IFCSUM. The same messages are also planned to be used by the port community partners.

5. Current and future use of Edifact and non-Edifact messages

The port community partners have answered that they plan to use or are willing to start using Edifact or non-Edifact messages. It is evident that the use of non-Edifact messages is decreasing. No partners in inland waterway port communities have plans to start using them, only three port authorities, four port operators and three shipping agents in sea port communities plan to use non-Edifact messages.

14 **port authorities in sea ports** are using Edifact messages and 9 are using non-Edifact messages. 38 port authorities in sea ports are planning to start using or continuing to use Edifact messages and two non-Edifact messages. 3 **port authorities in inland waterway ports** are using Edifact messages and 2 are using non-Edifact messages. 7 port authorities in inland waterway ports are planning to start using Edifact messages.

15 **port operators/stevedoring companies in sea ports** are using Edifact messages and 14 are using non-Edifact messages. 32 port operators/stevedoring companies in sea ports are planning to use Edifact messages and 4 are planning to use non-Edifact messages. 3 **port operators/stevedoring companies in inland waterway ports** are using Edifact messages and 1 is using non-Edifact messages. 6 port operators/stevedoring companies in inland waterway ports are planning to use Edifact messages.

The reason for the frequent use of non-Edifact messages can be explained from the fact that the port operators/stevedoring companies have been receiving cargo information from the industry in hinterland using industry specific messages for many years before Edifact was brought into use.

15 **forwarding companies in sea ports** are using Edifact messages and 11 are using non-Edifact messages. 30 forwarding companies in sea ports are planning to use Edifact messages. 2 **forwarding companies in inland waterway ports** are using Edifact messages and none is using non-Edifact messages. 7 forwarding companies in inland waterway ports are planning to use Edifact messages.

2 **trucking companies in sea ports** are using Edifact messages and none is using non-Edifact messages. 17 trucking companies in sea ports are planning to use Edifact messages. 3 **trucking companies in inland waterway ports** are using Edifact messages and none is using non-Edifact messages. 6 trucking companies in inland waterway ports are planning to use Edifact messages. In this study the trucking companies do not have EDI partners in the port community.

15 **shipping agents in sea ports** use Edifact messages and 14 non-Edifact messages. 31 shipping agents in sea ports are planning to use Edifact messages and 3 non-Edifact messages. 3 **shipping agents in inland waterway ports** are using Edifact messages and none is using

non-Edifact messages. 6 shipping agents in inland waterway ports are planning to use Edifact messages.

The shipping agents, like the port operators/stevedoring companies have been using EDI before Edifact was brought into use and for this reason many of the shipping agents are using non-Edifact messages.

6. Problems in message exchange, EDI users and non EDI users

The main problem areas in message exchange for all partners using EDI in the sea port communities are: problems in application interfaces (43% of all replies for the partners), not enough partners (39%), EDI projects are complicated (36%), lack of trained staff (32%). Edifact too complicated (31%), investments in EDI too expensive (27%) and lack of Edifact messages (22%).
Half of all sea port communities partners not using EDI feel that they have problems in message exchange.

The partners using EDI in inland waterway port communities reported that problems in application interfaces is the largest individual problem (73%) plus the lack of trained staff (9%). The biggest problems of the partners not using EDI in inland waterway port communities are that the investments in EDI too expensive (35%) and there are not enough partners (28%).

The port authorities in **sea ports** using EDI (28) have problems in not enough partners (14) with whom to do EDI. The second biggest problem is in applications interfaces (11), and the third (10) is the lack of trained staff.

Not enough partners (10) and problems in application interfaces (10) were reported to be the biggest problems in message exchange of the port operators/stevedoring companies in **sea ports**. The lowest score for problems was reported to be in the lack of Edifact messages (3).

8 forwarding companies in **sea ports** using EDI reported that they have problems in application interfaces. The second highest reason was not enough partners (7). Seven forwarding companies replied that EDI projects are complicated.

11 shipping agents (using EDI) in the **sea ports** reported that EDI projects are complicated and that 8 have problems in application interfaces. Seven replied that they do not have enough EDI partners.

One railway company using EDI has problems in application interfaces and lack of trained staff.

Five customs authorities who are using EDI reported that they have problems in application interfaces and that there is a lack of trained staff. Custom authorities who are not using EDI indicated that the problem with message exchange were on a lower level than in the customs authorities using EDI.

7. EDI investments and operating costs of EDI applications

The general distribution of the EDI investments and EDI operating costs for the port community partners are: EDI converter software (10%), application interfaces (30%), message implementation (30%), consulting costs (20%), own manpower costs (10%).

The distribution expectations for the future are that the EDI operating costs and the investments in the application interfaces (20%), message implementation (20%) and in consulting costs (10%) will decrease in two years time. But the training (20%), own manpower costs (20%) and the external vendor costs (10%) will be increasing. The distribution of the operating costs both currently and in future follow the distribution of the EDI investments.

8. Cost elements of EDI applications on operative level

Subscription fee for new EDI partners

Some port community partners are requesting subscription fees for new EDI partners. 2/3 of the port community partners are not requesting a subscription fee.

Port authorities (5), port operators/stevedoring companies (5), shipping agents (4), customs authorities (3) and forwarding companies (2) in **sea port** communities are using a subscription fee for new EDI partners.

Port authorities (2), port operators/stevedoring companies (2), shipping agents (1) and forwarding companies (1) **in inland waterway port** communities are using a subscription fee for new EDI partners.

User cost per message

Three different types of message cost base were noted: price per Kbytes, time based price, and fixed price per message.

The most commonly used message cost base is the price per Kbytes. This is used by the port community partners as follows: port operators/stevedoring companies (9), port authorities (7), shipping agents (4), forwarding companies (4) and customs authorities (3) and the sea port communities use the message price per Kbytes.

In inland waterways the port communities use the message price per Kbytes. This is used by port operators/stevedoring companies (2), port authorities (2), shipping agent (1) and forwarding company (1).

Data communication costs

A specific agreement upon the data communication costs is generally arranged between the port community partners. Only a few port authorities (3), port operators/stevedoring companies (1) and shipping agents (2) are using the principle who gains - pays.

9. Legal aspects of EDI

Do you make an EDI agreement with your EDI partners?

The use of an EDI agreement varies very much from port to port and from country to country.

The port community partners who are experienced in EDI normally make an EDI agreement with their EDI partners. Small and medium port communities do not normally make EDI agreements.

Who has the legal liability of data contents?

In 18 European countries participating in COST 330 the sender has the legal liability of the data contents in the messages. This varies between documents and countries.

Is the control message used for legal reasons?

The control message is commonly used for legal reasons. There is local and European legislation which stipulates the administrative procedures including the use of control messages, for example for the dangerous goods management and berth allocation.

Is the contents of messages secured during data transmission?

In some port communities the contents of messages is secured during the data transmission. This is most commonly done by using the technology of the data communication network.

Are EDI messages legally approved in your country, public sector/private sector?

In most of the European countries the EDI messages are legally approved both in the public and the private sector.