TOPIC 2
MARITIME
TRANSPORT (SIG)

TELEMATIC LINKS BETWEEN PORTS AND THEIR PARTNERS

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Abstract

Port information systems are now quite old and familiar. They can send information between the various agents in the port chain, and are useful for facilitating customs clearance. Their fields of action appear to have grown geographically and operationally with the setting up of many projects in Europe, partly due to the virtues of EDI, although these have been greatly exaggerated in terms of profitability.

INTRODUCTION

Port information systems are now quite old and familiar. They can send information between the various agents in the port chain, and are useful for facilitating customs clearance. Their fields of action appear to have grown geographically and operationally with the setting up of many projects in Europe, partly due to the virtues of EDI, although these have been greatly exaggerated in terms of profitability.

It is of interest to record the goals pursued and results obtained or sought, through an analysis of the factors having led to their implementation, and of those preventing their rapid widespread use. Lastly, we shall show how these systems fit into the logic of overall logistics chains, in which ports are merely one link.

TWO DIFFERENT EXAMPLES

Growing communication requirements and the constant improvement of transmission systems (RNIS, X400, VAN) are leading to changes in ports' information systems, which instead of merely meeting internal requirements are now opening up to clients.

In a port location, monitoring of goods and ships, from arrival until departure, involves many agents: forwarding agents, shipping agents, consignees, handling agents, brokers, port authorities, and customs. With the success of containerisation and hence that of combined transport, ports must be able to open up to other agents in the end-to-end transport chain, ie to land consignments, both in terms of transport resources and infrastructures, and in relation to information processing.

Many projects for opening up port authority information systems or port communities have been created throughout the world, and particularly in Europe, often with the support of the European Union (EWTIS, RTIS, ARCANTEL, etc). These projects vary greatly and have not always produced the results expected.

To illustrate this, we here present briefly two studies of differing cases. The goals are the same, but the implementation, and the political and economic contexts, very different, as are the results.

Planned Singapore

In early 1984 Singapore port authority implemented a system to manage goods and containers. At this time, the port had to handle 1.4 million TEUs of containers belonging to 68 shipping companies. Today the figures are 8.5 million TEUs of containers, and 168 shipping companies. This system, called Databox, administered management of documents relating to ships, containers and goods. Since many users of the port had difficulty accepting transactions without paper documents and non-hand-written signatures, the port authority increased telematic services, transforming its system into a more modern and suitable system along client/server concept lines. The authority supplied low price computer applications, while the modem and computer, which could be of the PC type, had to be purchased by the port operator. Consultation was a paying service, but updating of the port database is free of charge. Many port operators (shipping companies, handling agents, forwarding agents, etc) came to use the system, which has increased the number of services it offers in order to meet the needs of the various agents.

In 1985, on the initiative of the Singapore government, it was decided to implement a national infrastructure for information systems and electronic data transfer (EDI). Each governmental, commercial and industrial sector had to become computerised and send data through the national network. This network was set up in 1988, and is called Tradnet (Singapore Network Services). It consists of sector-based sub-networks for health, distribution, finance, maritime transport, air

transport, etc This network now has 7,600 subscribers, and manages over 95% of transactions relating to foreign trade (declaration of imported and exported goods, and goods in transit).

The Databox port system changed its name in 1989, becoming Portnet when it was connected to the national Tradnet network.

Today, thanks to the Portnet telecommunication information system, which is connected to Tradnet, commercial transactions between the United States and Singapore may be managed electronically (customs, transport reservation, port passage, etc). Tradnet has a connection to ACS, the EDI information system of American customs. By making a single declaration, a Singaporean exporter exporting to the USA may thus obtain very rapidly the export licence for the goods, and the certificate of origin of the goods will be sent directly to American customs. If it chooses maritime transport, handling, loading and monitoring operations, etc, will all be managed automatically within the port community by Portnet. By this means, it reduces its operational costs and also gains improved competitiveness by providing reliable and rapid services.

Implementing a national network of this kind is still a very complex operation. Its success is due to the commitment of all parties involved, total integration of all types of commercial operations and genuine support by the government.

Co-operation: Meditel

In the late 1980s, the port of Marseille contained a number of community information systems which allowed management of stopovers by ships (the Escale application, maintained by the port authority: the Meditel project), and of goods for export (the Protis system, maintained by a consortium of maritime freight operators with the support of customs).

In 1990, during the Editrans project, the goals of which were to promote use of EDI in all types of transport, and which was supported by the European Union, under the TEDIS programme, Marseille port extended its Meditel project to allow the introduction of electronic exchanges between partners in the port location and between the major Mediterranean ports. In addition, from this date forth, the Protis management application became the port authority. Project Meditel+ was born, and Marseille was its project manager. Its main goal was to set up a large Mediterranean network for exchanging port information, thus allowing ports to gain in competitiveness by increasing their services and by playing a role as an information-managing platform for the logistics chain.

A system of cooperation was initially set up between the ports of Genova (Italy), Barcelona (Spain) and Marseille to link together their information systems through the use of Computerised Data Exchange (EDI), based on the norms in force in Europe, ie Edifact. The port of Algiers was also to be connected to the network when the port of Marseille had finished installing the Escale system in the Algerian site. Conferences in other ports were organised with the aim of acquiring as many partners as possible.

In order to facilitate network connections, the GEIS (General Electric Information System) network was used as the physical support. Interoperability between European and international public networks poses too many problems and, above all, these networks did not have the expertise in this field, nor provide the requisite services.

For intra-community exchanges, each port retained its procedures and network support.

The information that the ports were to exchange was initially to be the ship arrival and departure notifications. This message was developed using Edifact norms by Marseille, but never transmitted, since the consortium considered that this type of information was of no use if the description of the transported goods was not included. A Manifest message has thus been constructed which is simple and conforms to Edifact norms.

The project's results have proved to be inconclusive.

Most non-European Mediterranean ports were not automated, or were just beginning to acquire information systems for managing ships and goods, as in the case of Algiers, or Tunis. And they were not very keen on joining the network.

Since the messages were developed solely by Marseille, they met only slightly or poorly the requirements of the other ports. In order to avoid ambiguities (often due to the Edifact standard) in understanding data, it would have been necessary to develop guides and interfaces specific to each port, and to each exchange between two ports. The cost of implementing a network of this kind was reaching a price bearing no relation to the service rendered. And ports such as Genova and Barcelona concentrated more on management of exchanges within the port community than with other ports.

Moreover, very little data is exchanged directly between port authorities, except perhaps in future with the Hazmat directive of the European Union concerning the transport of dangerous materials. Data relating to ships and goods transported in it are under the direct responsibility of the operators of the port locations (line agents, forwarding agents, etc). These transmissions of information between different port locations are usually made using companies' own internal networks.

PUSHING FACTORS

Trade facilitation

Despite all the progress made (notably by UN bodies), efforts at deregulation, and GATT and other agreements, the formalities associated with international trade are still numerous, lengthy, fastidious, and often lead to errors and delays. Although the accuracy of such statements cannot be measured, professionals say that information travels more slowly than goods, and that the latter are obliged to wait, in ports or other locations, for the information to catch up with them before indispensable formalities can be accomplished and the goods continue their journey. These bureaucratic operations undoubtedly provide employment to a wide range of professionals, but no-one can claim that these jobs are very productive. On the contrary, these formalities are costly, even if some estimates widely spread around often come from vague or hasty sources, or from rash generalisations.

Even customs departments are pushing for change and wish to be able to obtain cargo-related information more rapidly, even while ships are still at sea, in order to prepare container inspection sampling plans which are more efficient, although less restrictive, by consulting files on the partners to the transaction, before and after the maritime shipment itself, before the ship has even docked. This enables them to concentrate their efforts on suspect partners in transactions, and to be satisfied with reduced sampling rates on the vast majority of the remainder.

Almost all partners thus see the simplification and acceleration of procedure as elements which will encourage trade growth, and particularly international trade.

The use of new information technologies, which have been expanding rapidly during the past two decades, seems a means to reduce both transport time and the cost of the formalities associated with it. Things have come to the point where "trade facilitation" has become a point of commercial competition between ports in a given "range". The idea of free zones has been revitalised: a physically defined area, separate from the other parts of the port, to which customs officers guard access, is no longer required. The Dutch were probably the first to use computerisation to leave containers "ex-customs", thus creating the idea of a "Virtual Free Area".

One should also bear in mind the "Large Markets" such as the Single Market of the European Union (after the intermediate stage of the "single document" of the old European Econornic Community) or NAFTA. The creation of large areas, consisting of several countries, without overall internal border controls, is a major contribution to trade facilitation.

It should be added that, paradoxically, the strongest impetus for increased computerisation in nodal points, such as ports and airports, and thus of major progress in trade facilitation, did not

come from those in favour of openness, or those seeking to create markets with fair competition, or committed "deregulators", but rather from the public authorities, those agents of repression, who are more inclined to collect or extract information than to distribute it. They intervened in several ways, for various goals: customs services, concerned about the payment of duties and taxes; police forces, with responsibility for fighting trafficking, whether of drugs, arms or anything else; safety officers, in ports and elsewhere, wishing for information about the arrival of dangerous materials, or of those harmful to the environment. Only these "Authorities" had the power to impose implementation and use of port and other computer systems on all the agents concerned, such as forwarding agents and other members of port or airport communities. Without this pressure there would have been many economic agents which would have seen no value of making the investments in computing equipment and personnel training for what was a dubious and uncertain return for them; whereas the customs office, bearing in mind the scale of its operations, can see in it real value for itself.

In time operations

The rise in real interest rates, combined with the reduction in transport costs, have over the past twenty years changed the nature of the balancing act that loaders must constantly make between the economic efficiency of transport resulting from the use of mass transport flows, and the cost of storage, a condition which must frequently be met for such mass transport; this cost is itself related to the immobilisation of the goods stored, the cost of the storage installations, and the cost of the unknown production and sales factors related to stock reduction. This led to the growth of logistics, which has given rise to much literature over some twenty years: zero-inventories, just-in-time, Kamban, demand-driven services, etc are the result of this development.

In such a context, costs relating to storage, and in particular costs relating to risks of under-supply and under-stocking will appear less important the faster and, above all, the more reliable is door-to-door transport and, as the expression goes, station-to-station transport: deadlines are guaranteed, and guarantees can also be given that agents will be informed early in the event of an incident, such as a delay, loss or theft, which must never be ruled out.

Once again, therefore, the quality and reliability of the transport chain will depend on the information chain. In fact, the logistical revolution of the past two decades has consisted to a large degree in integrating the transport of goods with the circulation of information. It has been made possible by the progress in computing and tele-computing: "just-in-time" is possible only if information is able to circulate rapidly and reliably.

Intermodal transport

We have no intention of repeating here the story of the astounding growth of containerisation which, in a few decades, has profoundly altered the organisation of maritime transport: the structure and size of line ships, organisation of handling, consortia, round the world tours, etc However, these changes are not confined to the maritime part of intercontinental transport. The very nature of containers makes them a vehicle which is equally suited to land transport, whether by road, rail or river. Despite certain difficulties relating to standardisation and dimensions, it is very well-suited to use with pallets, which are the dominant devices in land transport. The combination of these two types of vehicle has allowed the modular system to be set up, which has opened up the field of door to door transport. However, this lengthening of transport chains implies that they have also become more complex: goods, pallets and containers are transported and stored in many different transport vehicles and storage locations. Moreover, these operations are undertaken by just as large a number (and sometimes an even larger number) of transport operators, of all kinds: operators specialising in one transport method or multi-modal ones, and secondary ones providing services which are quite often difficult to define or list. The overall structure can operate only in organisations with a greater or lesser degree of hierarchical structure; the types of organisation possible, or even actually found, are more numerous than the possible or actual types of organisation of the physical operations (transport, handling, storage). All of this

must also operate in a transport world which is probably less adventurous than in previous centuries, although far from free of unpredictable factors.

This amounts to saying that, from this point of view too, the quality and efficiency of the information chains are as important, even more important, than the quality and efficiency of the physical operations.

Information efficiency is indispensable to each operator in undertaking operations for which it is responsible. It is even more indispensable in preparing and undertaking relays from one operator to the next: what goods and what containers are to be delivered to the next operator? Where and when? How are boxes to be arranged in the loading unit, in order for their recipient to know exactly where to find them in order to transfer them, safely and speedily, and in precisely the right location, into the next storage location or in the next transport vehicle? Or, further along the supply side, how are boxes to be arranged in the transport vehicle so as to simplify things for the next operator, and so that the vehicle is immobilised for as short a time as possible? This is how operational researchers have spent their time. It is also, with the help of technological developments, what stimulated the imaginations of all those who had to have themselves sent large amounts of information, rapidly and safely, for such purposes. It was also important that it did not cost too much; but initially, little attention was paid to this aspect, making subsequent disappointments all the more bitter.

But, in the 1980s, and up until today, what enthusiasm, and what passions, indeed, were aroused by all the automatic and electronic data transmission methods, and particularly by EDI! This led to expectations of massive and easy communications within professions, regions, countries, and between professions. We were moving towards a world of universal communications, which were at last to be uniform and open.

This belief under-estimated the technical and organisational difficulties. It also over-estimated the desire for openness of many operators, carriers, loaders and other agents.

Environment

More recent preoccupations, those relating to environmental protection, have to some degree taken precedence over the fiscal and protectionist goals justifying intervention and controls by the customs authorities, which had lost ground in the manner described above. These preoccupations are felt most keenly in the closed seas, such as the Baltic and the Mediterranean, since it is here that the threats are greatest. And it is interesting to note that one of the first telematic-related port projects, promoted by I.A.P.H. (International Association of Ports and Harbours) around 1985, the E.V.H.A. project, was even at this time concerned precisely with inter-port exchanges of information relating to dangerous materials. It was all too frequent that a material which had had to be declared dangerous at its embarkation port had lost its harmfulness in the declarations made at the port of disembarkation, no doubt under the effect of the healthy sea air! These same preoccupations have come back with a vengeance in the recent European Union directive named Hazmat. It may be the case that, backed up by the development of Green Logistics, customs may be making a come-back, on sea and on land.

CRITICAL ISSUES

Technical difficulties

Information and telecommunications systems are coming to be used in transport circles only slowly, and the entire logistics chain is a long way from having been penetrated.

However, widespread use of information systems had made it possible to offer many software application and network solutions: there is no lack of them on the market, and they are slightly more affordable these days. But global technical solutions usually require major investments in

both financial and human resources for their implementation. This is particularly true in the case of inter-company computerised data exchange (EDI).

Management of the implementation of these new information technologies requires a very advanced assessment of the economic and commercial conditions of growth, and also strategic vision.

Among the factors that must be taken into account, telecommunications and applications must include the essential role of economic impact.

In Europe, communications which must cross borders pose serious critical problems; this is one of the points which has slowed down growth of automatic data exchange, and in particular EDI.

Other problems emerge when specific telecommunications services are used; these often have a cost/benefit relationship close to negative, especially in the case of small and medium companies. In several European countries, use of X400 networks is more costly than use of the fax, although they have equivalent service levels for firms which do not have appropriate information processing resources.

Software applications also introduce difficulties. For example, applications for the use of EDI are now mass products widely found on the market. Links with databases are customarily undeveloped or little developed. They only rarely meet the specific requirements of the various users. As a consequence, this situation of non-interoperability inevitably leads to the development of in-house interfaces. The result is major costs, delays, and also a poor level of quality.

The complexity of a task of this kind requires that many attributes are considered for an EDI application to be effective: transaction management, translation of complex formats, a high level of security, etc.

Setting up new techniques for data exchange requires many interfaces. In addition, it is necessary to calculate transaction volumes, and to analyse the profitability of the necessary investments. It is also necessary to examine minutely the true nature of the exchange, considering attributes such as "formal" and "informal", depending on the nature of the transaction, and "structured" or "unstructured", according to the telecommunication procedures.

There is no justification per se for introducing new information techniques; there are merely opportunities which must result from the economic and commercial assessments. These new technologies must implemented at the right time, neither too early nor too late, and in the right site.

Pricing and cost sharing

In a market as competitive as that of transport, the price factor is of primary importance, even if one is considering new or improved services. Offers of service in the information system field are varied and competing. Lastly, long-distance telecommunications costs are coming down in price rapidly, which is widening the field of competition.

Services are generally offered through specialised information system operators under the name VAN (Value Added Network). The latter may also be specifically devoted to transport services, or indeed serve several economic sectors. This is frequently so in the distribution sector, in which VANs also act as instruments for refined sales forecasts, in real time.

The investment costs required to set up such systems are still substantial, despite the downward trend of the price of computers and of telecommunications costs. Two items of major expense remain: the application, and the reorganisation costs induced by these computer solutions.

Application costs will remain high, especially in the case of small operators in the logistics chain. Since data processing services are closely related to those for transport operations, it is difficult to use unmodified standard applications, the low purchase costs of which are a result precisely of their widespread distribution, as is the case with wordprocessing and spreadsheet applications.

These problems, together with those related to personnel training and organisational consultancy, may be partially resolved by making this service a cooperatively based one in the port location. But in this case it is not easy to share the costs, since the large transport operators do not wish to participate in such organisation if they already have their own information system, often with worldwide geographical coverage.

Here too, the solution may consist in connecting these local systems to other, more global ones, in order to share the costs and increase commensurately the range of services offered. Unfortunately, these large systems are not easy to interconnect, as we shall show in the next section. But the problem of the equitable distribution of the costs of large interconnected systems is extremely difficult. Firstly for obvious commercial reasons relating to the relative position of RVA operators; but secondly, it is technically difficult to individualise cost prices finely in relation to immaterial services, such as telecommunications.

And this is aggravated by the difficulty involved in separating the costs of the sub-services offered to the end user. Unlike pure telecommunications networks, pricing is not merely a question of simple parameters such as distance and/or connection time; this is due to the added value, and also because one must know who is adding it in the chain. This problem of the distribution of costs is a real difficulty, unless the local operator is receiving a subsidy, whether direct or indirect.

Another problem is that of the level of pricing acceptable to the end user, ie the loader. In the case of a service which replaces an existing service, it is difficult to propose a higher price. For example, reservation by the loader of means of transport with the logistics operator was traditionally done by telephone or fax, the only cost being that of the communication, whereas in a VAN there is a charge for the reservation service itself. It is obvious that it may not be higher than its previous equivalent. Worse still, in the case of monitoring services (tracing/tracking), the loader will not be happy to accept being invoiced for this service if it is used to learn the position of goods which have been lost or delayed.

All these technically and commercially difficult factors mean that VANs for use in ports are not meeting with great success and that the price of them is still high. In comparison, it should be noted that the prices of equivalent services for air freight are considerably lower, since there is greater experience, and cooperation between operators is considerably more developed, as organisations such as IATA and SITA attest.

Interoperability and norms

Information processing units are to be found on all desks, both for commercial and industrial work functions. These information processing facilities are now starting to be widely interconnected. This increasing networking is changing working conditions, allowing very fast exchanges and very useful pooling. The inherent nature of these networks varies considerably, according to the requirements (voice, data, multimedia), and real transmission possibilities (PTT), size of company, operational methods, communication support, etc.

Commonly, these networks are divided geographically into LANs (Local Area Networks), MANs (Metropolitan Area Networks) and WANs (Wide Area Networks). Companies generally know how to manage their local networks (extension of de facto standard TCP/IP for switching, and a deliberately centralised policy towards choice of facilities, applications and procedures). The MAN example is typically represented by the network of a port community or teleport; the dimension remains regional or cooperative. WANs cover the entire planet; only large companies or VANs are capable of administering these networks; large maritime companies, such as Maersk, or P&O, and a few others manage all three levels. Due to a real balkanisation of the networks, small companies usually use the public operators, but in this case it is difficult for transmissions to cross borders.

All fundamental tele-transmission services are now traditionally divided up into three main functions: transmission (infrastructure network), command and control (tele-computing network) and service (value added to information given out). A distinction must be drawn between the

content and the container and also, within the information itself, between information given out explicitly, and that added for service requirements.

The central function is switching, ie the system which switches, and then links up correspondents to one another. We shall briefly define the two main types of this function, on which the others are highly dependent:

- packet mode (X25): data is grouped into packets which are then processed like post. This gives great operational flexibility, and many services, such as dynamic transmission, storage, and multiple distribution, may subsequently be added.
- temporal asynchronous (ATM): recently created. It is the first type of switching specifically adapted to data. It supports both high transmission rates and their peaks, allowing database consultation owing to its intrinsically fast response times, and file transfers as a consequence of its capacity.

The complexity of all these services is sufficiently great for it to be impossible to guarantee compatibility between them in all cases. The technique for transferring information from one country to another, or from one company to another, consists in isolating hierarchically the sub-networks which are to communicate between one another via specialised interface systems called: bridges, routers, brouters or gateways, depending on their level of functionality.

These interoperability problems are central to the preoccupations of the European public authorities and standardisation organisations (ISO, ISO, CCITT, EDIFACT, etc), which wish to maintain possibilities for competition in this manner in networks which would otherwise be confined to the setting up of an excessive number of specialised networks.

This is clearly possible only if there is wide availability of large polyvalent and very interoperable telecommunications infrastructures. The key example, the Internet, which is not strictly speaking a network, but an infrastructure and a set of functional and usage rules providing a link between tens of thousands of different networks. Although the level of interoperability is not perfectly satisfactory, the capacities offered are broadly sufficient.

Many solutions have gradually been implemented, the sole principle behind which consists in linking two or more networks using gateways, or interfaces, taking account of the specific problems of data transfer.

Standardisation of exchanges is frequently presented as an indispensable precondition to the distribution of these new technologies, despite the fact that computer technology has invaded many fields in the almost total absence of norms relating to its use. But it is true that lack of a common framework for exchange is leading companies to resolve their problems on a case-by-case basis, often within a wider partnership.

The processes of standardisation are slowing down marketing considerably since they are proving to be so complicated and rigid. They are taking time, thus increasing the risk that alternatives of less general value will come to predominate. Moreover, this is also frequently leading to norms being overloaded in a counter-productive manner with devices enhancing the beauty and general applicability of the concept, something standardisers are very keen on adding, in the generally vain hope that nothing will be forgotten. This is indeed the case with X400 norms, in respect of which developers are devoting themselves to profiles, often with little mutual compatibility. Similarly, Edifact norms used in the formats of information messages for exchange mean that users in a partnership must develop sub-messages meeting their requirements which are totally incompatible with those used by another pair of users.

A (major) special case relates to the support of exchange telecommunications, for which there are particularly severe regulations, established and maintained by the single national operator. This uniform framework, which is presented as an asset, in reality constitutes the main obstacle to data exchanges with foreign countries. Two opposing types of solution have been implemented to overcome these problems and thus allow interoperability: total control of the exchange by partners using private networks, or use of large specialised international networks, generally called VANs.

Whatever solutions are adopted, they require special technical skills which are not yet very widespread in Europe owing to the existing telephone operating monopolies.

The complexity of the new information technologies, and the globalisation of economic exchanges, requires increased international cooperation. Interoperability between international networks depends on there being a consistent combination of the following resources:

- distributed databases,
- use of resources using the client-server model,
- interconnection platforms for routing, and
- wire-based or radio-based access tele-computing networks.

PORTS AND THE LOGISTIC CHAIN

Integrated operators

The transport world has developed greatly, like the remainder of the economy. In particular, the phenomenon of globalisation has given large transport operators an increased role. They have expanded in three main directions: wider geographical coverage, even covering the entire world, multimodal operations, and more complete services covering all logistics services. Many large shipping companies manage some terminal container transport. For example, in order to avoid the Panama canal, large American companies provide coast-to-coast rail transport using modern monitoring resources.

To a large extent, this has been made possible through the implementation of vast telematic networks. At the heart of the latter are the servers and/or central units (mainframes), which keep records of all operations. It is above all an internal management tool, but many shipping companies have partially opened their computing services to their loader clients. In the other direction, the largest amongst them transfer their customs documents to the authorities directly and electronically.

The services offered vary, ranging from improvement of procedures, such as being able to make reservations from terminals, to more recent services such as tracing and tracking. All sorts of operational methods have been implemented, ranging from passive management to real-time management, and including proactive methods. To this end, operators use methods involving file transfers, electronic mail, EDI, automatic fax transmissions, and transaction-driven processing.

These companies control sophisticated resources for electronic management of goods flows, and have been doing so for a quite considerable time. From this point of view, a movement into port constitutes another load break, in terms of the flow of information which is transmitted to port operators. There is partially, but very clearly, a situation of competition with actual port systems which is not easy to manage, for reasons relating to the sharing of costs and the pricing of services, described in a previous section. But also for technical reasons relating to the diversity of the resources used, which are rarely interoperable on a simple basis.

Cargo community systems

Conversely, small operators are unable to implement technical solutions of this kind, due to a lack of sufficient financial and human resources. Community solutions are the logical answers to these problems. By sharing information processing resources and teams of computer experts, small operators are able to reach the requisite critical mass. In many cases, the port and/or customs authorities have provided technical and financial assistance for the implementation of these community solutions.

These solutions are now quite old, but they have developed using very varied methods, reflecting the variety of organisations and services in the ports themselves. The oldest one in Europe dates from the early 80s, with Hamburg's Dakosy system.

Possible development alternatives:

- deliberate commitment regulation
- centralised systems sharedsystems
- logistical services customs clearance
- local service interconnected to other ports
- transport service global service
- maritime transport all methods

Solutions actually used vary greatly, which is consistent with the diversity of goals.

However, it may be observed that, in Europe, these port community systems have not had a great impact on the operation of the transport chain, except in relation to customs clearance. They use direct or indirect subsidies in order to continue to provide the service. These loss-making systems were implemented for competitive reasons, each port wishing to make itself more attractive by showing that it offered modern services which could speed up movements and/or improve the quality of port services.

Development is found here, but implementation seems to cover a wider field and the services are less expensive. This relates to the more established mastery of information systems by airlines, which have allowed their freight departments to benefit from skills acquired in the sector of large passenger reservation systems. Furthermore, these companies are more used to the practice of cooperation between operators, notably thanks to their organisation IATA. The latter even analyses technical solutions, and proposes specifications and standardisations.

Global systems

Another approach consists in following the logistics chain throughout its length instead of being concerned solely with the port charge break. In this case, two different approaches are possible: either to link the ports using telematic networks, or to have a world-scale VAN.

In the air industry, a VAN of this kind was created a few years ago by a consortium (Traxon) of large operators (Air France, Lufthansa, Japan Airlines and Cathay Pacific). Although its geographic coverage is genuinely worldwide, the process of getting it up and running is proving very slow and uneven, and financially it is still in the red. This imbalance in the distribution of users shows that the system is in fact used for local requirements in certain airports.

More modest projects for linking ports have appeared over recent years. None of the telematic systems is heavily used, but in that they are complements to the local systems, the problem of profitability is not really posed. In Europe one could mention:

- MEDITEL initialised by the Port of Marseille and intended for use by other Mediterranean ports,
- NTMM another Mediterranean initiative, aimed at control of the transport of dangerous materials,
- RTIS European Union initiative,
- ARCANTEL a regional initiative by southern Atlantic ports,
- EWTIS links together the main ports of the North Sea,
- PROTEC also links together the ports of the North Sea, but is more oriented towards control of ship movements.

As in the air industry, the local broadly prevails over global. This is related firstly to the role of customs clearance, which is linked to the authorities of the port's country, but also to the fact that links relating to the logistics function are naturally provided by the maritime companies. However, interconnection between port systems and global systems would greatly enhance the value of the overall system. Unfortunately, interoperability of these planetary systems is still very poor and requires very diverse and very costly gateways.

CONCLUSION

The ambitions which gave rise to these projects or achievements were big, and concomitant with the slightly unrealistic hopes which were attached to the use of EDI techniques. In reality, EDI techniques are spreading very slowly into the transport sector, and port information systems, whether community-based or open, have not been very successful and are generally loss-making.

Not enough account was taken of human and organisational factors, which are the very basis of transport activity. It is easier to automate an information processing chain, than to collaborate with a set of partners in establishing very varied systems and getting them to cooperate with one another. Only the problem of trade facilitation is more or less clear and resolved.

Among these problems, that of the exact role of the port in the logistics system has become more difficult to assess as the economy has become more globalised. Maritime companies are not keen to adapt information systems to suit each different system in each port.

Over and above commercial considerations, and questions of competition between ports, the perspective of the end client, the loader, is to be convinced that a system brings it real added value in comparison with previous procedures, and to know at what cost.

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